COMPUTERWORLD

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T/S News

NEWSPAPER

Mini-Maxi Mix Melts Mint's Order Entry Cares

By Don Leavitt
Of the CW Staff

OTTAWA, Ont. – Picture a modest, fairly stable mail-order business that estimates its daily workload accurately enough with a rule-of-thumb that a pound and a half of mail equals so many orders.

Then it puts a new item on sale. Management anticipates a reasonable increase in orders with the new line.

But the next Monday morning, the post office delivers 10 tons of mail . . . and more the next day . . . and more the day after that . . .

Wild dream? For most DP shops, yes. But the nightmare came true for the philately section of the Royal Mint here when the first series of Canadian Olympic coins went on sale last January.

There was sheer chaos for quite a while, admitted Barney Deschamps, who is in charge of order processing, but today things are moving along very smoothly and in fact new applications are being considered now that the basic Olympic coin handling is under control.

The key to the new-found control is a series of programs written for and being run on various Datapoint 2200 systems at the mint, with time-shared access to an IBM 360/85 at Systems Dimensions Ltd. providing computing power that isn't available on the 2200s.

'Weird Mix'

"That sounds like a weird mix of capabilities and maybe I'm a little strange," Deschamps admitted, "but I like to get a job done and this system works."

Vucom CRT-based terminals linked to the 2200 manage the posting of the orders and the entry of administrative items. But sorting the massive customer file – "they're all around the world" – is as natural a chore for the 2M-byte 360/85 as it would be an unnatural strain on the small machines.

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★ CW Special Report on Data Entry Follows Page 28 ★

New User Group Aims to Evaluate, Compare Service

By Don Leavitt
Of the CW Staff

NEW YORK – Users may gain objective evaluations and comparisons of services offered by the time-sharing industry if a user organization that is being formed attains its founders' goals.

Charter memberships in the nonprofit Association of Computer Time-Sharing Users (Actsu) are being solicited by co-founders R. Clifton Young, manager of strategic planning, Borg-Warner Chemical, and Hillel Segal, who is with the financial modeling group at Hertz Corp.

If the association really takes hold – "and more than 100 users have already joined" – it should have enough expertise available to create standardized programs to exercise a number of different networks, Segal said last week.

One of the biggest problems faced by users considering any of the time-sharing services is trying to anticipate costs and knowing how costs and services from one vendor compare with costs and services from others. With results from standard test runs in hand, Segal went on, Actsu will be able to cut through the "enormous range of pricing structures and billing algorithms" that currently exist.

"We'll be able to tell our members that a 1,000-statement Fortran program, for example, costs so much in time and money on vendor X and so much on vendor Y."

Surveys of operating characteristics, preprogrammed capabilities and geographical coverages offered by the various vendors will also be made by the association. Segal anticipates, in addition, other surveys focusing on frequency of downtime, quality of technical support, liability under service contracts and quality of educational materials provided by the vendors.

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Sharp Objections Raised

NCIC/CCH Message Switching Approved

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Administration officials have voiced strong opposition to a recent decision by the Justice Department to add message switching capability to the already controversial FBI-controlled National Crime Information Center's (NCIC) Computerized Criminal History (CCH) system.

Attorney General William B. Saxbe received letters from John Eger, acting director of the White House Office of Telecommunications Policy, and Douglas Metz, acting director of the Domestic Council Committee on the Right of Privacy, criticizing the move.

The go-ahead was denounced as a violation of the "understanding" between Saxbe and the Congress – an understanding that no further action would be taken on the system until pending criminal information privacy legislation is approved or lawmakers are "consulted."

The authorization, which came in the form of a memorandum from Deputy Attorney General Laurence Silberman to FBI Chief Clarence Kelley, empowers the FBI to establish a system that would switch any state request for a computerized criminal record from the NCIC/CCH index to the state where the particular record resides. Every state request would go through the FBI.

Although at present the fledgling CCH system contains criminal records of single- as well as multistate offenders, the ultimate objective is to store only records of multistate offenders in the Washington computer. Single-state offenders' records would remain in their respective states for reasons of "cost-effectiveness and privacy," according to an FBI spokesman.

"A switching system, therefore, will be needed to direct inquiries to the states where those records reside," he explained.

Records of single-state offenders, the FBI man said, constitute about 70% of all criminal records.

Switching Redundant?

To a certain extent, states already have the capability of accessing each others' records through a state-run, state-controlled and state-financed system called the National Law Enforcement Telecommunications System (NLETS). Upgraded in July 1973 with funds from the Law Enforcement Assistance Administration (LEAA), NLETS now provides states access to each other completely by-passing the FBI. Many favor further upgrading that manual system.

To date, the CCH system has netted only four state participants. Several states joined and dropped out, but many have never joined because they believe they neither need nor want the FBI system with its subtle implications of federal control over local matters.

Controversy over control and security has surrounded the system since it was originally proposed, and as long as privacy safeguards are still not guaranteed by legislation, it is the opinion of many CCH critics that no further action should be taken on CCH until legislation is approved.

Eger's Oct. 11 letter warned that the decision to permit the FBI rather than the presently operated state-controlled NLETS system to control message switching could allow the FBI to "monitor communications" between local law enforcement agencies, causing "an undesirable shift in the delicate balance between federal and nonfederal law enforcement."

(Continued on Page 2)

Blind Selection Overcomes Va.'s 'Brand Name' Bias

By Nancy French
Of the CW Staff

RICHMOND, Va. – No matter how impartial a person tries to be in selecting an automobile, a presidential candidate or a computer system, "brand name bias" can creep in to distort objectivity.

The Commonwealth of Virginia licked the "brand name bias" problem in selecting this state's more than $6 million computer system by concealing the identity of each bidder from the selection committee until the final decision was made.

While the concept is simple enough and is commonly used in market research, the technique is rarely applied in selecting hardware vendors, according to Dr. Howard Bryant, director of the commonwealth's Division of Automatic Data Processing.

Concealing the identities of computer system vendors "is not a simple thing to do, but if you're willing to invest the time the way we did, it's not an impossible task," said Bruce Freed, systems engineering administrator.

State officers used a variety of techniques to mask vendor identity including "laundering" their language, using ranges rather than specific numbers in describing hardware capabilities and breaking systems down into comparable modules for independent evaluation.

Three Teams

The process took about a year and three different teams were employed.

The analysis team compiled the Request for Information (RFI) and then wrote 13 summaries comparing vendors on 13 factors previously weighted by a state management group in order of importance.

The selection team consisted of representatives from various state agencies who evaluated the summaries, scoring each vendor on a scale of 0 to 100.

And the selection review board, comprised of DP professionals from universities and businesses, reviewed the actions of the other committees to assure impartiality.

"The major step in writing the RFI involved laundering our language," Freed explained. "No terms, words or phrases related to specific vendors were used.

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Privacy Issue Wends Way to Local Level

By Nancy French
Of the CW Staff

Federal legislation conceived to safeguard citizens' rights to privacy has sparked interest on the state and community levels throughout the country.

In Oregon as well as Massachusetts, formal action has been taken on a state level to protect privacy.

The Oregon Department of Human Resources has adopted "a declaration of rights for individuals for individual privacy."

The policy formally endorses rights of privacy for clients of the department's divisions of public welfare, children's services, vocational rehabilitation, corrections, employment, health, mental health and special programs.

It also calls for the development of "standards under which information will be released and for an evaluation of a plan to require client consent prior to release of all data."

Further, the policy calls for elimination of useless information, guarantees confidentiality, permits a client to review his own file and be told who has been given information from his file and creates a privacy review board through which a client can appeal inaccuracies or inappropriate use of information.

According to Cleighton Penwell, department administrator, "information is power. The legitimate 'need to know' must be prevented from evolving into a 'right to know' that is greater than an individual's 'right to privacy,'" he said.

The measure adopted in Massachusetts [CW, Oct. 23] is an executive order requiring all state agencies to observe fair information practices when dealing with personal information maintained on state residents.

The "Fair Information Practices Executive Order" covers right of access, restrictions on disclosure, knowledge of the information's intended use and restrictions governing use by and transfer to agencies other than the original collecting agency.

In areas where legislation and executive orders are still in the "contemplative" stage, testimony both pro and con is being heard by state privacy commissions.

In Jefferson City, Mo., a law enforcement official has pointed out that collecting criminal records serves to protect innocent people as well as apprehend criminals.

Citing drunken driving accusations made against Sen. Thomas F. Eagleton (D-Mo.) during the last presidential election campaign, Maj. William A. Dolan, chief of field operations for the Missouri Highway Patrol, said Eagleton's innocence was proved by the records.

Since the patrol maintained all records of such charges, he explained, the absence of any charges on the Senator proved that he had never been arrested for drunk driving.

"If we had a policy of expunging old arrest records at that time, it might not have been possible to determine whether Eagleton had faced such a charge," he said.

He suggested as an alternative to "overrestrictive" privacy legislation legislation to guard computer systems from potential misuse and punishment for persons who misused computer information.

"Unreasonable restrictions on law enforcement agencies could become self-defeating . . . by thwarting the purposes for which the information originally was gathered," he added.

In Little Rock, Ark. attorney general Jim Guy Tucker has asked for a study on whether the Criminal Justice Highway Information Center computer should continue to be used to store Social Security Numbers and whether computerized driver record information should continue to be sold to insurance companies.

The center's security and privacy committee heard state police chief Gale Weeks testify that the numbers are not absolutely essential but were "useful."

Center director David Eberdt explained he thought the system could operate without the Social Security Numbers but they were useful as "tiebreakers" – when data on individuals with the same name made positive identification difficult.

In Arkansas the privacy issue is also a revenue issue, since the data processing center produces about $500,000 in annual revenues on the sale of drivers' records.

Ford Questions Public's Right To Unlimited Access to Records

WASHINGTON, D.C. – While applauding efforts of the House and Senate to act on bills insuring the privacy of records contained in federal data banks, President Gerald R. Ford recently questioned provisions in H.R. 16373 and S. 3418 allowing individuals unlimited access to certain records.

"The immediate objective [of privacy legislation] should be to give every citizen the right to inspect, challenge and correct information about him contained in federal agency records and to assure him a remedy for illegal invasions of privacy by agencies accountable for safeguarding his records," Ford said in a statement released by the White House press secretary.

But, he added, "the right of privacy must be balanced against equally valid public interests in freedom of information, national defense, foreign policy and law enforcement."

In particular, Ford objected to provisions of the House bill which would allow individuals unlimited access to records "vital to determining eligibility and promotion in federal service and access to classified information."

He "strongly urged" Congress to amend H.R. 16373 to provide "workable exemptions to accommodate these situations."

Against Board

Ford also indicated he does not favor measures in the Senate bill establishing a federal board "empowered to define privacy in its own terms and to second-guess citizens and agencies.

"I vastly prefer an approach which makes federal agencies fully and publicly accountable for legally mandated privacy protections and which gives the individual adequate legal remedies to enforce what he deems to be his own best privacy interests," Ford commented.

Though he does not support the concept of a privacy board, the President did suggest favorable look to the Executive branch's Domestic Council Committee on the Right of Privacy for assistance in strengthening privacy and confidentiality in income tax records, criminal justice records and other areas identified by the committee.

Justice May Battle False IDs With Computer Cross-Checks

WASHINGTON, D.C. – Attorney General William B. Saxbe has announced plans to create an advisory committee which may use computer systems to tackle the problem of false identification.

Increasingly used by criminals to escape detection, false identification can be easily assumed once a dead person's birth certificate has been obtained, explained David J. Muchow, trial attorney with the Criminal Division of the Department of Justice and chairman of the new advisory committee.

Often received through the mail, the birth certificate can then be used to acquire a false Social Security Number, driver's license, credit cards and other papers, he added.

Considering ways to make it more difficult to obtain a dead person's birth certificate for fraudulent use, Muchow said, "If state vital statistics bureaus cross-filed death certificates with birth certificates, officials would know immediately when someone applied for the certificate of a person already dead.

"We would probably use computer systems to link death to birth certificates," he noted.

Study HEW Statistics

The advisory committee will study the use other federal agencies have made of computers in the area of vital statistics, according to Muchow. In particular, committee members will examine computer systems employed by the Office of Health Statistics under the Department of Health, Education and Welfare.

"We will also look at the progress made by the Passport and Emigration and Naturalization offices which are working with the Mitre Corp. to minimize the use of fraudulent passports and emigration documents," he commented.

"Looking at the whole area of false identification as a specific problem in criminal justice," Muchow said, initially his committee will investigate the use of false proofs of identity in such areas as narcotics peddling, tax and welfare frauds, check forging, bank swindles and concealment of illegal aliens.

Open to the public, the organizational meeting of the committee will be held at the Department of Justice on Nov. 14.

CCH Message Switching Rapped

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It could "result in the absorption of state and local criminal data systems into a potentially abusive centralized, federally controlled communications and computer information system."

Metz, whose Oct. 22 letter explained the administration's policy with regard to privacy of personal information, urged the Justice Department to "prepare a privacy safeguard plan prior to any decision affecting the data processing or communications component of the NCIC."

Who's Control?

The dispute is an extension of the original disagreement over whether the NCIC, which came out of the Search project would be state or federally controlled.

The FBI won that earlier battle, and now, since the states have not exactly overwhelmed the FBI with the speed at which they are turning over their files, the FBI is moving to gain access through this other means, another critic said.

Eger also told Saxbe that "unless the present precipitous action is halted and these further steps are completed before any further action is taken, I'm afraid the government may be faced with a runaway situation that would require drastic congressional action to halt."

The FBI is expected to submit a formal plan for the system to the Office of Telecommunications Policy Oct. 31.

In a DP Operation

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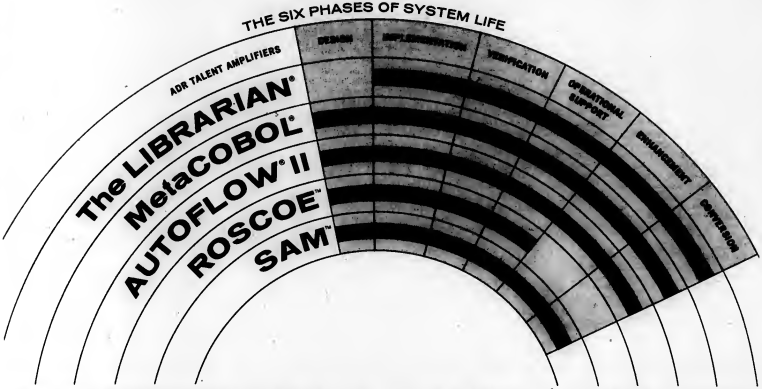

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'Laundered Language'

Blind Selection Overcomes Va.'s 'Brand Name' Bias

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"We defined our own terminologies and, in most cases, the vendors responded with the same terms," he said.

"For example, instead of using 'spooling,' we defined the term 'multistaged I/O.' Instead of using 'JCL' for job control language, we defined the term 'processing control language' (PCL).

"In writing the summaries, we used ranges to describe equipment capabilities that were about the same," Freed said. "For example, we said, 'All vendors had line printers with speeds from 1,000 to 1,200 line/min'."

The letter designation used to represent each vendor was changed randomly from summary to summary so that no connection could be made, for example, between a single vendor's software and his operating system. The vendor identified as "vendor A" in the summary concerned with operating systems may have been referred to as "vendor B" or "C" on the summary written about "other software.

"But every vendor's identity could not be concealed on every single factor," Freed noted. On the "conversion" factor "it was obvious which one was IBM.

"We already had IBM equipment, no conversion was necessary, and obviously IBM had the highest rating in that category," he said.

In writing the summaries, all capabilities that were about the same for each vendor were omitted.

"We included things that were significant, that could lead to a selection – where vendors' capabilites had trade-off value or one could be rated better or worse than another," Freed explained.

Evaluation Objectives

The state's two basic objectives in evaluating the system were to determine "how well the system performed" and "how easy it was to tell it what to do – how easy it was to use," according to Freed.

"These two objectives were carefully spelled out in the RFI," he said.

Under each overall objective, certain factors had been weighted ahead of time by a state management group and assigned points accordingly.

Each member of the selection committee gave each of the 13 factors a score ranging from 0 to 100 points. These scores then were multiplied by the preassigned value set by the management group to derive the final rating for each vendor on each factor.

"In addition," Freed explained, "we had two unweighted factors. The first, value analysis, was our analysis of the cost of the system. We compared such things as lease plans, purchase plans, five-year costs, operators' freight, cost of hardware, cost of software, test time given free and test time charged.

"The second unweighted factor was the exemplary performance test – a test of very specific functions of the data management system rather than a benchmark. Each vendor ran these tests under our staff's observation."

Process of Elimination

"We agreed at the outset to go into a second phase of competition if we didn't get a difference of more than 10% in quality points between the top two contenders," Bryant said.

"Out of a total of five vendors that were considered, one disqualified quite early because that company didn't meet the mandatory requirements, so four went into the second round," he explained.

Two were eliminated here, Bryant said, because they were more than 10% below the top two in quality points.

"Burroughs and Univac were almost exactly tied in points, so a final round of competitive negotiations was conducted to clarify their proposals on four points: the data management system, conversion, training and best and final price.

"We were trying to get a separation."

Since the prices quoted by the two top competitors were so close, cost ceased to be a factor, according to Freed, and Univac was finally selected because it agreed to provide needed support in training and conversion, and it offered data management system modifications on a better schedule.

Slated for delivery in July 1975, the new system will be a large-scale, on-line system dedicated to the state's human affairs activities – making welfare payments and determining eligibility for aid to dependent children, for example.

In addition, the system will handle the state's criminal justice records, including the corrections department, the state police and ultimately the courts.

The configuration will call for a 2 by 2 Univac 1110 with two processors and two input/output access control units.

"It was a relatively clean procurement," Bryant pointed out. "Since these were mostly new computer applications for us, we didn't have to worry too much about conversion or equipment replacement."

Mini-Maxi Mix Melts Mint's Cares Away

(Continued from Page 1)

The Datapoints were acquired early last spring after the initial flood but while a heavy flow of Olympic coin orders was continuing. The batch-oriented Honeywell 58 that was in place just couldn't keep up, Deschamps said.

Programming the screen formats and prompting instructions for the entry clerks was done by an outside consultant – "my section of the mint can't really justify a full-time technical staff" – and took until May. But once installed, the coding has chewed away at the outstanding orders at an ever-increasing rate, he noted.

Deschamps was impressed with the basic stability of the Datapoint system software. In fact, he was so sure of the system, he recently reached out and turned off one of his operators' terminals without warning.

The screen went dark and the operator swore (mentally, if not openly) at Deschamps. Then she flipped the switch on again and was off and running with barely a break in her coding rhythm. All the data in the partially entered order was in place.

The data editing capabilities of the system has led to a "neatly done" order entry application. Deschamps' competent but casual consultant ("I charge $7.50/hr if I have to wear a tie and jacket") built him a system that "doesn't allow" the operators to make serious mistakes.

The interactive approach gets orders in the system promptly without the traditional intermediate steps and costs of keypunching which were required – and perhaps practical – when the Honeywell 58 was able to handle the work.

The order entry programs now in use take the bilingual nature of the Ottawa area into account. The prompting messages are available, at operator request, in either French or English.

(Even this writer was able to follow the promptings [in English] and enter an order without special coaching from Deschamps or the regular operator!)

Deschamps also gave Datapoint tremendous credit for finding software wherever it might be and whenever he needed it.

"All I've got to do is tell TRW [Datapoint's agent in Canada] I need a routine to do thus-and-so," he said. "If they can find it locally, they will.

"Otherwise, they contact Datapoint in Dallas, and they go to work on the problem. If they don't have anything like we want, they probably know some Datapoint installation that does.

"The software Datapoint finds may be operational or still in development. It may not have terribly good documentation and it may even be somewhat different than our particular needs. But it's a start. If nothing else, it gives us a chance to see how someone else attacked the problem," Deschamps explained.

While that approach may have mixed results, the mint has also found software vendors that specialize in supporting the Datapoint equipment. In particular, Deschamps cited the packages produced and marketed by Bristol Information Services of Fall River, Mass.

NRMA to Announce Standard For Retail Merchandise Tags

QUEBEC CITY – The National Retail Merchants Association (NRMA) will announce its voluntary retail identification standard at the association's 16th Annual Information Systems EDP Conference here this week.

The Universal Vendor Marking, as the code will be known, will appear on merchandise tags in OCR-A Size 1 type.

The code is designed to be human-readable for the customer and small retailer and wand-readable for the larger retailer.

While some larger stores may want to do some marking of their own on the merchandise tickets, such as department numbers, the standard tags contain most of the information needed for inventory control and other reports, according to NRMA.

The tag will contain eight fields. The first field will consist of a four-digit class and a four-digit season number; the second will contain a three-digit vendor number and a five-digit vendor style number.

The third field will have two digits for color and three for size, and the fourth field will contain the same but uncoded information so it can be read by the consumer.

Fields 5 through 7 on the tag will be left blank for each individual store's use; the final field will contain the price.

NRMA's systems specifications working committee, which has been studying the problem of merchandise and customer identification for three years, recognizes that only further technological evaluation of OCR, according to Irving Solomon, vice-president, NRMA Information Systems Division.

"NRMA has coordinated the project and enlisted the assistance of manufacturers and suppliers, as well as the Department of Commerce and National Bureau of Standards, in order to obtain a compatible technology for use in the future as well as in the transition from mechanical registers to electronic point-of-sale devices," he said.

Antitrust Settlement Bill Passes House

WASHINGTON, D.C. – The House of Representatives' version of the Tunney Bill, an act which would require the Justice Department to disclose the reasons behind its settlement of large antitrust cases out of court [CW, Oct. 9], was passed recently with a comfortable margin.

Essentially the same as S. 782, which passed the Senate sometime earlier, H.R. 17063 also stipulates that when a case having "general public importance" – such as the IBM antitrust case – is settled out of court, the Justice Department must file the proposed settlement 60 days before it can become effective.

In addition, Justice would be required to file a kind of "public impact statement" outlining the possible effects of the proposed consent decree.

The public would then have a chance to comment on the proposed settlement and the judge could call witnesses.

Capitol Hill observers called the differences between the House and Senate versions "minor" and said they will be resolved easily in conference. A final vote is expected shortly after the election recess.

T/S Group to Compare Services

(Continued from Page 1)

Thus far, the Association of Data Processing Organizations (Adapso) and its Remote Processing Services Section (RPSS) are noncommittal about the formation of Actsu.

Stephen H. Beach, vice-president of Service Bureau Co. and president of RPSS, acknowledged only that RPSS "is aware of the new organization and will be discussing it at our annual meeting at the end of the month."

Police Performance Monitored

NEW YORK – A computerized arrest-monitoring system will soon be keeping track of police performance here by providing detailed data on each arrest made, from arraignment to final outcome.

Previously, the department relied on limited surveys for such information, but they rarely showed the performance of individual officers. Thoroughness was limited because court dockets and records had to be examined and only the major charge in each arrest is recorded in New York City's data.

Under the computerized system, arrest data from the New York State Department of Criminal Justice and disposition data from the state Judicial Conference, both in Albany, are combined on tapes to provide a detailed profile of each case, including the name of the arresting officer.

But a spokesman said the information will be used for more than evaluating individual performance; the larger goal is to spotlight problem areas, thus improving current training programs.

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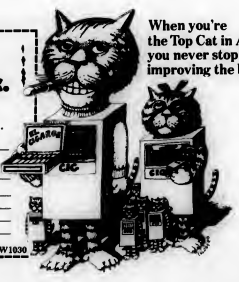

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Control Model Slated To Pinpoint Pollution

PHOENIX – While little can be done to move polluters to new locations, computers can be used to protect susceptible high-concentration areas.

Dr. Neil S. Berman, an Arizona State University professor, has received an $8,000 research grant from the U.S. Department of Agriculture Forest Service to construct a "computer atmospheric control model" showing where in this state high concentrations of pollution are likely to occur under certain conditions.

The thrust of Berman's study will be to map out potentially high-pollution areas in undeveloped, nonurban portions of the state. The Forest Service will then determine which areas are best suited for development in mining or recreation uses. Determining possible trouble areas would indicate where to put new campgrounds, allow industry to mine raw material and locate access roads.

Scientists in Los Angeles and St. Louis are developing similar models.

Toothsome Tale

It's no fish story that Pflueger Marine Taxidermist in Hallandale, Florida uses an IBM System/3 to keep detailed track of piscine parts from thousands of game fish processed annually. This shark denture framing Dave Helene, a supervisor at Pflueger, may once have given more than just lip service to trophy enthusiasts.

Centralization Aids in Boosting Managers' Salaries 10.2% in '74

LAKE BLUFF, Ill. – Top managers of DP installations in business and industry are benefiting financially from the trend toward centralization, according to the *1974 Weber Salary Survey on Data Processing Positions in the United States*, published recently by A.S. Hansen, Inc.

Managers of the DP function now earn an average of $537 weekly or $27,924 annually, the survey showed, a 10.2% gain over 1973 salaries.

A few managers make more than $50,000, with the highest salary reported at $54,000.

Central Trend

"Compensation for the management group has been going up 9% to 10% annually during the last three years because of the increasing trend toward centralization of equipment or its control," said Robert J. Greene, a consultant with the Philip H. Weber salary administration service section of A.S. Hansen.

"The top DP man is also reporting to a higher level now. He sometimes reports to a president and is often a vice-president himself," Greene continued.

"Because of his higher organizational status, the DP manager is moving up faster than the controller, to whom he most likely would have reported a few years ago."

The 1974 Weber salary survey contains data on 110,611 DP employees in 1,461 installations. The study also analyzes salaries for 82 DP positions in 10 different industries: construction, manufacturing, transportation, communication, utilities, wholesale trade, retail trade, finance and insurance and services and government.

Reporting categories include five sizes of DP installations and 98 individual cities.

Other Gains

Other categories that showed impressive gains in 1974 were: software (systems) programmers, 10.8% (4.8% in 1973); systems analysts, 8.7% (4.4% in 1973); keypunch operators, 6.5% (2.8% in 1973); and computer operators, 7.2% (5.6% in 1973).

For applications programmers, the 1974 increase was 4.8% compared with 5.1% in 1973.

"A portion of the larger gains in 1974 may well be attributable to the lifting of wage controls," Greene noted.

A.S. Hansen is at 1080 Green Bay Road, 60044.

Lloyd's Booklet Lists Services for Clients Around the World

LONDON – Lloyd's Register of Shipping has published a booklet outlining computer services and technical programs now available to clients worldwide – literally from Austria to New Zealand.

The group has expanded its technical inspection and advisory services for ships and offshore structures to include computer-aided solutions for a wide range of engineering problems.

System Selection

Lloyd's booklet lists such systems as: an integrated structural analysis system for stress testing three-dimensional structures such as hulls; a ship-ocean environment simulation system for making predictions on vertical and lateral bending moments for hulls; intact and damage stability; and analysis of fixed platform and semisubmersible structures, as well as analysis of concrete and soil structure interaction.

In addition, Lloyd's is offering assistance with information retrieval and the preparation of statistics from their technical and other shipping data, maintenance of the survey state of all ships classed by the society and lists and survey date reminders for owners.

Lloyd's Register of Shipping is located at 71 Fenchurch St., London, EC3M 4BS.

Union Dispute?

Sabotage Rocks N.Y. Police Installation

NEW YORK – Sabotage hit the New York Police Department's DP division this summer as the staff prepared to install two computers in the new headquarters building.

Police have not arrested anyone in connection with three wire and cable cutting incidents, all of which were aimed at interfering with the DP center, according to a police spokesman.

While one police source blamed the sabotage on a jurisdictional dispute between two electrical workers' unions locals, a DP department spokesman said "anyone could have done it." The dispute arose when the local that put in the building's electrical system objected to a second local installing two IBM 370/158s in the DP center.

The first signs of sabotage were discovered in May, when wires leading to two electrical pipe-threading machines were found cut off. The machines had been used in the computer room's air conditioning center. The damage was minor, sources said, and took only a few hours to repair.

Two months later, however, someone entered an electrical closet on the third floor and cut cables leading from a basement generator to the seventh floor data center. Three-foot sections were removed from nine cables, each more than an inch in diameter. Replacing them cost $10,000, police said.

After that incident, police tightened security and began installing special alarms throughout the building wherever cables were accessible. However, before the alarms could be made fully operational, police found a main 20,000 V power cable in a basement area outside the main power room had been cut.

Police have now set up special surveillance systems and make hourly checks. The heavy security measures may be the reason why there has been no further damage since the last incident in August, the police spokesman said.

While the sabotage incurred substantial costs in time and money for the city, the DP division spokesman said they did not actually delay installation of the computers.

Instead, work on the DP center's special air conditioning system is running a week beyond the scheduled completion date, and the computers will be brought in shortly after the air conditioning system is ready.

U.S. Weather Service Attempts to Speed Forecasts, Warnings

WASHINGTON, D.C. – The National Weather Service has started testing a computerized weather information system which it expects will speed storm warnings and give forecasters more time to evaluate changing conditions.

Scheduled for completion in 1980, the $40 million Automation of Field Operations and Services (Afos) network will link 275 weather offices and ease the problem of trying to update forecasts. The computers will be programmed to select only the information required by a certain station from data flowing across the nation.

The most dramatic improvement is anticipated to come with tornado and flash flood warnings. It now takes five to 10 minutes or longer for a tornado warning to be issued – sometimes too late for the warning to do any good.

With Afos, however, the time from the first observation of danger to the warning will be cut an estimated two or three minutes.

Foresters Project Future Yields

STEVENS POINT, Wis. – Paul Bunyan would never approve. A computer is now being used in forest management to predict future growth rates.

Prof. William Sylvester is teaching his students at the University of Wisconsin-Stevens Point efficient management of woodlands through the use of computers at the campus' computer center.

One of his students, Tom Hanson, made a study to determine yields of even-aged red pine in the Great Lakes states. The study indicated that if the age of a timber stand and the number of trees per acre are determined, projecting yields is simple. The computer is fed this information plus figures on the average diameter and height of the trees.

After experimenting with the data, the forest's future can be projected.

Thinning makes a significant difference in growth rate. The computer shows red pine (Norway pine) provide the highest volume of cords by thinning at age 30 or 40 and then harvesting at age 50.

IRS Gets Tough On Tax Returns

WASHINGTON, D.C. – It's going to be more difficult to outwit the Internal Revenue Service (IRS) this year – and computers can be thanked or blamed for it, depending on your point of view.

Computers are scheduled to be used to a greater extent in selecting the returns most likely to show tax deficiencies when audited, Donald C. Alexander, IRS commissioner, said.

Audits are becoming more effective as the IRS increases its use of computers. Previously, the agency made only limited use of returns from corporations and financial institutions on dividend and interest reports.

With the increased aid of computers, however, the IRS expects to make full use of such documents and this is expected to result in the collection of a large amount of additional taxes.

Minn. System Forced To Spend Own Money

ST. PAUL, Minn. – Officers of a statewide criminal information system here are being forced to find ways to stop spending money they don't have – or face the grim possibility of program discontinuation.

"If the program is shut down, we may have 400 sheriffs marching into the governor's office someday," Pal Asija, executive director of the Minnesota Criminal Information Systems (Mincis), told officers after learning the program was in debt.

The Mincis system, which uses two Univac computers, was being supported by unappropriated funds because of a budget error approved by the state administration department, according to the department's commissioner, Richard Brubacher.

Queried on the present status of the system, Brubacher said it is "very much viable. It's funded and operating, but funding for further developments and refinements had to be cut back."

Why Did the Criss Get Crossed?

PORTLAND, Ore. – An "X" might be the only thing left marking the spot where a cooperative police computer program had been.

The Columbia Region Association of Governments' criminal justice committee recently denied funding of $361,000 for the Columbia Region Information Sharing System (Criss).

The recommendation to cross out Criss resulted from the costs of inflation and a lack of real performance, according to District Judge Gregory Milnes of Washington County, chairman of the criminal justice committee.

Criss was already in hot water in Washington County, where every police department but one had rejected membership in the project, complaining of high costs, slow response time and domination of the program by only two state counties.

N.J. 'Search' Plan Would Place Terminals in Every Courthouse

NEWARK, N.J. – A system that would place terminals in every courthouse in the state and in law libraries is being planned here.

The project, part of the System for Electronic Analysis and Retrieval of Criminal Histories (Search), will link the terminals with the state's central computer. The computer would store every court decision made in the state court since 1948, when the present constitution of New Jersey became effective.

Arthur J. Simpson, the administrative director of the courts, said the legal data which could be accessed by the terminals "would be available swiftly on a full-text basis. We would have all filed reports, statutes, court rules and other materials in the computer.

"We could retrieve this data and replace the time-consuming tasks of research with a simple push of the computer button."

He added that restrictions would be placed on certain types of data, such as grand jury testimony, that might be considered confidential.

Search, a federal project which began with an emphasis on law enforcement and corrections, has now begun to stress computerization of court records.

County Tax Assessor Assesses DP Program

BOISE, Idaho – Someday a house owner may have to battle both an assessor and the DP department to get the tax assessment on his property changed, if the Ada County assessor's office has anything to say about it.

A program is currently being devised in which a computer program will help verify the market value on tax records. But it would only reinforce judgments already made by humans, according to deputy assessor Mike Clark.

Recent Properties

About 60 test runs of the program show the current market value on record could be 80% behind the actual market value of homes in Ada County. Only property recently sold is being tested so that the computer value and the selling price can be compared.

Although most of the test runs were very similar to the selling price of the property, Clark feels the program is not ready for use yet. It will be one or two years before the computer assessments will be used for actual comparison, he cautioned.

The program currently takes about 30 characteristics into consideration. It also compares the property with 50 or 60 other properties which have been sold recently, but Clark hopes to have a comparison list of 150 to 200 properties in the final program.

If bought ready-made, the program might have cost as much as $100,000 to $150,000, he said. "But we've done it all ourselves and we figure it costs about $15,000.

Room for Improvement

Begun last March, the program still needs some improvements. Clark feels its main problems are in setting the land values and not taking careful consideration of garages and other car-storage areas. Time is still needed to verify the information of all the houses tested and also to add more sales to the comparison list.

When it is completed, the program will be used only to check the values determined by the assessor. If the two figures differ, the assessor will have the final authority.

Coming to You in Color?

COLUMBIA, Mo. – Bioengineers at the University of Missouri-Columbia (UMC) are now experimenting with methods of presenting computer image displays in true colors.

The color display process developed by the engineers entails electronically scanning a color photograph or transparency and then converting it into digital data stored in a computer system.

Programmed Color

The data, when called out by the system console, is then converted into a color display on a CRT. The computer can also be programmed to generate color from computer software.

Although eight colors and hues can readily be generated, the color displayed on the CRT is not as brilliant as UMC engineers would like, due to limitations in the existing CRTs design.

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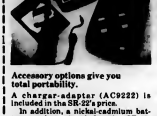

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Reduce Welfare Errors

System Tracks Down Wage Dodgers

BALTIMORE – Maryland's welfare department is using a computer to cross-check Social Security Numbers in tracking down what it calls "the largest and most expensive" kind of fraud – unreported wages.

The system began operating last month, when social workers received computer printouts on each welfare recipient whose self-reported income did not agree with figures gathered from employers.

David T. Mason, secretary of the state department of employment and social services, said the computer is expected to detect most of the significant cases of unreported income, which he estimated costs the taxpayers $9 million annually.

The computerized check is the most recent development in the state's move toward automated scrutiny of welfare recipients, which includes photographic identification cards and a welfare data exchange with Washington, D.C., to prevent a person working in one area from claiming public assistance in the other.

The trend has caused alarm among several welfare and human rights organizations who see it as a possible threat to privacy.

Officials, however, have justified the system on the basis of a federal directive decreeing Maryland must reduce its overpayment errors to 5% of the total caseload by June. Its current overpayment rate is 28.5%.

Mag Tape Filings Extended by IRS

NEW YORK – In an effort to assist businesses, including banking institutions, to reduce their paper costs, the Internal Revenue Service is accepting information documents forms W-2, 1099, 1087 and 1042S series filed on magnetic tape.

Use of the magnetic tape filing program will eliminate the cost of purchasing and preparing paper documents for both federal and most state agencies. IRS also said the new segregation regulation requiring the forms to be filed in batches with and without identifying numbers will not be required of magnetic-tape filers.

Users of the program may design their own forms.

IRS says it will provide technical assistance, including testing of the final program prior to actual conversion, for those wishing to take advantage of the savings. The complete list of information documents that may be reported on tape is: 1099-INT, 1099-DIV, 1099-MED, 1099-MISC, 1099-OIO, 1099-PATR, 1099-L, 1099-R, 1087-INT, 1087-DIV, 1087-MED, 1087-MISC, 1087-OIO, 1042-S, W-2A, W-2P and the agriculture subsidy payment report.

Near-Mrs. for Heath?

LONDON – All British Conservative leader Edward Heath has to do is ask.

Heath recently told an interviewer that he regretted never having married and, within a few hours, a computer dating firm had found what they claimed to be his perfect partner.

The dating firm said the potential spouse, an Estonian countess exiled in Britain, considers Heath "dignified and refined."

The computer matched Countess Regina von Seinbock, who fled Estonia during the Russian takeover, with Heath's vital statistics. The countess has many of the same interests as Heath and mentioned the Conservative leader when she become a member of the dating service.

System Changeover Shortchanges Elderly At Lakeview Acres

SYKESVILLE, Md. – A change from a state to a federal computer system has put the residents and operators of the Lakeview Acres Domiciliary Care Home in financial jeopardy.

The changeover, which was to increase monthly board money, has actually decreased the amount of money residents have been receiving. And, since there is so little money coming in, the management is having difficulty keeping the home running.

Mrs. Rose Kelly, who with her husband leases and runs Lakeview Acres, said the financial problems vary with each individual. Most of the residents at Lakeview should be getting $240 a month, but some have received $25 or less.

A new law calls for an increase of $30 more than last year and Mrs. Kelly has been calling state and federal officials to find out exactly where the money is.

Until last January, the state and federal funds were handled separately. But a supplemental security income program was initiated at the beginning of the year under the auspices of the Social Security Administration.

The errors are a result of the new increase and the changeover to the SSA computers and, according to Mrs. Kelly, this has caused all the financial problems.

Paul B. Boroughs, an administrative assistant at the Social Security district office in Baltimore, acknowledged there were major difficulties with the new system.

Boroughs said efforts were being made to correct the errors. He explained that the computer had been working under old information and it would take time to reprogram it.

Parking Bureau Has Sympathetic Shoulder

ROCHESTER, N.Y. – Motorists who wish to dispute parking tickets here have a means of doing so out of court with the birth of a parking violations bureau.

Growing out of a computerized ticketing system that left ticketed persons with no one to listen to their complaints, the parking violations bureau now has total responsibility for such violations. It is totally outside the criminal justice system.

Although computerized, the old system allowed people to avoid paying fines for illegal or overtime parking because no one ever followed up the computer-generated summonses, a city spokesman said.

The new system allows motorists to appeal tickets and summonses before a specially appointed attorney. It also provides a more complete follow-up procedure for collecting fines from chronic nonpayers through a newly granted power to garnishee salaries and attach or impound the personal property of violators judged to be in default.

Editorials

More Questions for Bell

The introduction of a credit authorization terminal by the Bell System brings us right back to a basic set of questions that never seem to get proper answers.

Certainly the Transaction Telephone (as Bell calls it) is a well-conceived device and, as Bell hopes, it can provide the small merchant with an effective way to check customer credit from a variety of charge plans.

But is this just another telephone or is it actually a data transmission terminal?

AT&T has a habit of complaining about the specialized carriers that skim the cream from its high-profit private-line markets. Yet it is doing the same thing in a different way.

When Bell resources are devoted to developing a specialized device to aid banks and merchants, there is little benefit to that now famous little old lady in tennis shoes with her basic black phone. Maybe she already has all the phone service she will ever need. But if that is so, why does her monthly bill keep increasing? Could it be that she has to share the cost of specialized Bell devices that she will never use?

The Transaction Telephone works fine on dial-up lines. Yet if some other vendor built an exact duplicate it would be classed as a potential cause of harm on the same dial-up line and would require connecting arrangement. Why?

A 1956 Justice Department consent decree forbids Bell from offering services of a data processing nature. Presumably this means data processing terminals. If so, would this apply to the credit terminal and/or the Dataspeed 40 CRT?

We don't presume to have the answers to these questions. Certainly no one wants to deprive users of low-cost, effective equipment from Bell or any other vendor.

The Federal Communications Commission and its regulatory powers were created by Congress in 1934 to protect the using public from the potential abuse of monopoly. But in the last few years the system seems to have created more problems than solutions. Maybe it is time for Congress to update the system.

Mini Cobol Is Here...Finally

It has taken many years, but Digital Equipment Corp. has finally released Cobol for the PDP-11.

On the surface, the announcement of an ANS Cobol compiler on a minicomputer may not seem to be all that important; however, the long-range effects may be revolutionary.

No longer will there be a need to procure a larger mainframe to train programmers in Cobol, and educational facilities can now more easily justify a Cobol machine for business students.

Many small schools have only Fortran and Basic available on the "school" computer, and justification for business students to learn computer programming without "the business language" has always been weak.

Hands-on experience is vital for training programmers and the budget for small business schools and small programming schools has been heavily burdened trying to procure time and facilities for running student programs. With an inexpensive Cobol machine available, the end result should be more adequately trained Cobol programmers.

DEC's compiler alone is not the final answer, but it does serve as an endorsement that Cobol can be used on a minicomputer.

The minicomputer leader has taken an action that will surely be followed and conceivably surpassed. The cause of business programming has taken a major step forward.

'First Things First, Baby!'

Letters to the Editor

Continued Development of Fortran Would Be Better Than Current PL/I

Before PL/1 overshadows Fortran, someone should publicly point out that marketing, not logic, is probably the reason for the push behind this "new" language. Succeeding generations of Fortran could have easily included the features of PL/I.

Literal assignment (e.g., X='EXAMPLE'), GET STRING, PUT STRING (ENCODE AND DECODE) and multiple statements per line have long been available in Control Data Corp. Fortran. The addition of a DO TO n statement would have given the block code facility so convenient in PL/I:

```
      IF (X.GT.O.O) DO TO 100
         Y=Z/X
         CALL FRED (X,Y,W)
100   CONTINUE
      ELSE DO TO 200
         Y=10.0
         CALL ALICE (X,Y,W)
200   CONTINUE
      DO TO 300 WHILE (W.GT.O.O1)
         P=P+W
         CALL MARTIN (P,W)
300   CONTINUE
```

The lack of statement numbers in PL/I is at times a serious disadvantage. The END statement is remarkably ambiguous for a language touted to be ideal for "structured" programming.

Other shortcomings of PL/I include lack of ability to read in a variable format, lack of ability to pass based variables and lack of ability to READ into parameter variables; all of these features are important in applications programming.

Worst of all, PL/I is developing in the wrong direction. I find the Optimizing Compiler to be worse than the F Compiler; it encourages sloppy programming by doing things the programmer should do, while at the same time failing to do some of the things even Fortran IV does.

This is not intended to be an outright blast at PL/I; I like the language, but Fortran VI or Fortran X would have been a better language.

R.A. Baker

Houston, Texas

Excluding Macro-Generated Symbols Can Solve Cross-Reference Problem

In response to the letter of R.A. Sobieraj [CW, Oct. 9] with regard to the desirability of having a "smart cross-reference," I also agree with his diagnosis of the cause of the problems, the inclusion of macro-generated symbols.

However, the solution he recommends will not solve the problem. If the cross-reference listing omits all unreferenced symbols, the result will be elimination of programmer defined symbols which happen to be unreferenced and inclusion of macro-generated symbols which are referenced by other macro-generated instructions.

I believe the recommended solution should be to provide the option of excluding all macro-generated symbols, whether referenced or not. This is especially desirable when the option to suppress printing of macro-generated code is in effect (PRINT NOGEN). This improvement would produce a cross-reference listing that would be smaller in size and more useful in program analysis and debugging.

Richard Barth

Rego Park, N.Y.

Complete References 'Smarter'

R.A. Sobieraj advocates opting for a cross-reference phase in his Assembly language compiler which would list only the symbols he referenced rather than all the symbols defined.

Experience teaches me "change is the name of the game." When I go into a program (usually written by someone else) and add a new symbol, I consult the cross-reference listing to insure I pick a unique symbol. If only *referenced* symbols were listed, I'd chance picking a previously defined symbol, only to be informed of this by a compiler diagnostic.

I opt for complete cross-references. I think they are "smarter."

R.H. Wood

Denton, Texas

Optional Approach Exists

In response to R.A. Sobieraj, who asked for an option on assembly cross-reference lists to only show referenced symbols, it exists and is useful.

I worked for over a year at an installation where we used the option. For further information, I would suggest that Sobieraj contact Woody Marvel, American Finance Management Corp., Silver Spring, Md.

Martin L. Stahl

San Francisco, Calif.

Interpreting Those SDs

No wonder Lockheed is having problems ["Report Gets Measures' Meaning Across," CW, Oct. 16]; David Schumacher has been misinterpreting their data.

Most statisticians agree that about 68% of all cases fall within the range of one standard deviation (SD) on either side of the mean of a normal distribution, and 96% are within plus and minus two SDs. He is correct in stating that about 99% are within three SDs.

A "usual performance" range bounded by +1.5 SDs would include about 86% of the cases.

Bruce C. Libby

Department of Public Welfare
State of Minnesota
St. Paul, Minn.

(Other letters and viewpoints on Pages 15, 16, 17 and 18.)

Plain Talk on Privacy—Part 2

Policymakers Only Concerned About 'Use and Misuse'

By Daniel B. Schneider
Special to Computerworld

The objective of the whole privacy issue is really the prevention and redress of those wrongs done to individuals that result from the misuse of information about them.

"Misuse" is use of information that is neither in the public interest as set out in law nor proper and necessary to the business and social dealings in which individuals either elect or are compelled to engage.

Note that the focus is on use and misuse. Privacy policymakers couldn't care less about the collection, processing and storage of information except as it affects use and misuse.

What they are concerned about is dissemination of information, the quality and quantity of the information disseminated and the results of that dissemination.

We information processors have been smug about the fact that we are the custodians of personal information. Because someone else determines and carries out the collection and use of the data, we proclaim our neutrality and our subservience to orders from management and our users.

We say that our only responsibility is "security," and it is an amazing, sad and yet altogether understandable fact that "security," when applied to personal data, has come to be almost synonymous with access control.

As was shown in Part 1, burying our heads will not insulate us from the effects of the storm. What we must do is recognize our unique position and use it – if not to manage the tempest, at least to enable us to survive within it.

There are five actions that we can and must take.

- First, we must inform our respective managements the day is almost at hand when we, they and our organizations will be liable for actual and punitive damages plus injunctive relief for injuries to employees, customers, clients, suppliers and any other persons described in our data systems when those injuries result from misuse of information or from an "unfair information practice." Injunctive relief may also be obtained when no injury has in fact occurred.
- Second, we must persuade the top management of our organizations to establish a single focal point for privacy, a person or office which is neither a user of personal information nor subordinate to the demands and pressures of users of personal data.

Because privacy is essentially a legal problem and because it will be enforced

Viewpoint

in the courts, the organization's legal counsel should be a prime candidate.

User Accountability

- Third, we must work to condition our users to seriously consider privacy whenever they propose to establish or augment a personal data system or use information already collected for one purpose or another.

We must make our users at least ponder the implications and consequences of their proposals, including the level of information quality that should be established. By quality I am referring to such things as reliability, accuracy, relevance, timeliness and completeness.

Of particular importance, we must work to promote a sense of accountability in the user for the quality, use and misuse of the information we process and store for him. If and when our organizations must give public notice of a personal data system and the person responsible for it, it should be the user executive who is named and who will defend the system.

This will be the most difficult action to accomplish. Unfortunately, much of the difficulty lies in us, for we are still a long way from that degree of trust which will allow the user to accept accountability without a fight.

Perhaps the greatest good to our profession that stands to emerge from the privacy issue is substantial improvement in user-DP relations.

(Continued on Page 16)

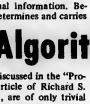
Cobol Algorithms Don't Need Professional Publication

Cobol algorithms, discussed in the "Professional Practices" article of Richard S. Heiser [CW, June 5], are of only trivial importance unless programmers can reliably use them without having to test them.

The whole concept of such building blocks is based on their being previously tested. How the earlier testing is done and to what extent it can be verified is therefore important.

The standard way of testing Fortran and PL/1 algorithms is to publish the codes for criticism. Heiser thinks this should also be done with a Cobol algorithm but, in addition, it should include adequate testing methods in its *own* documentation.

The Taylor Report
By
Alan Taylor, CDP



His argument is that in this way installations can use Cobol algorithms even without professional publication being organized, a matter which could take some years.

But the tests must not only be adequate, they must also be easily understandable. One great giant test is not adequate because an installation reader may be uncertain if he understood everything.

Heiser himself used five tests to document the checkout of his Cobol algorithm Superstructure (a general-purpose file update program). The documentation of these five tests is not large, amounting to some eight single sides, and even without any narrative is quite simple to read.

The first test involved taking a master file of 10 records, coded M010 through M100, and including the literal Old Mast and running against it an activity file of two changed items (at 10 and 90 level), an added item (level 49), a deleted item and an added item which, he noted, was added past the master end of file.

Each was noted on the input as being part of Test 1. A card-by-card review of the output of the test showed if the various items changed were in fact correctly changed, added or deleted, and if additions past the master end of file were successfully made.

When a test like this is designed, what it tests for – and what it doesn't test for – is itself defined. A user can rely on the algorithm then only to the extent that the tests are complete.

As a result of reviewing the first test, for instance, it can be noticed quickly that there is no addition before the beginning of the master file. To do that we would need a new item, say A09, and Test 1 contains no such test. Heiser apparently left it out to simplify either the test itself or the understanding of the test, an equally valid requirement.

He certainly didn't hold it out because he forgot it – it is in his second test.

Complex Activity File

The second test Heiser created used the same input master file but a slightly more complex, 12-item activity file. The first item covered the requirement of checking additions before a master start, while the fourth, fifth and sixth covered the problem of multiple changes.

The seventh and eighth items covered the problem of checking first an add and then a change occurring, and the next two dealt with the more complex situation of the add, then the change, then the delete.

The cards indicate what they are on their face, making it easy to check the results.

Heiser's third test covered the cases where only changes take place; the fourth test dealt with what happens when data is added to a null master and the fifth dealt with the errors of having a missing master when an attempt is made to change or delete it, when duplicate records or out-of-sequences occur, etc.

In brief, the Heiser set of tests is quite comprehensive for the file update function and, more importantly, it is easy for anyone else using the Superstructure algorithm to understand and duplicate. Publication of Superstructure, of course, would help qualify it – and would perhaps serve to uncover some problems for which tests had not been made – but is simply not necessary because the tests are simple to understand.

It Works

The joint Cobol algorithm/simple tests system works. It does not have to wait for publication mechanisms to be created and any installation using the Heiser Superstructure algorithm will be able to use it simply by having one person do its own internal certifying.

Cobol algorithms are technically usable now! And that's a big step forward for commercial data processing.

THIS IS THE INPUT MASTER FILE FOR TESTS 1, 2, 3 AND 5:

M010	TEST DATA	OLD MAST
M020	TEST DATA	OLD MAST
M060	TEST DATA	OLD MAST
M040	TEST DATA	OLD MAST
M050	TEST DATA	OLD MAST
M060	TEST DATA	OLD MAST
M070	TEST DATA	OLD MAST
M080	TEST DATA	OLD MAST
M090	TEST DATA	OLD MAST
M100	TEST DATA	OLD MAST

NULL INPUT MASTER FILE USED FOR TEST 4

THIS IS THE TEST 1 ACTIVITY FILE:

C010	CHANGED	TEST 1
A049	ADDED	TEST 1
D080	DELETED	TEST 1
C090	CHANGED	TEST 1
A110	ADDED PAST MASTER END OF FILE	TEST 1

THIS IS THE TEST 2 ACTIVITY FILE:

A008	ADDED BEFORE MASTER START	TEST 8
C010	CHANGED	TEST 2
A077	ADDED	TEST 2
C060	CHANGE NUMBER 1 OF MULTIPLE CHANGES	TEST 2
C060	CHANGE NUMBER 2 OF MULTIPLE CHANGES	TEST 2
C060	CHANGE NUMBER 8 OF MULTIPLE CHANGES	TEST 2
A081	ADDED TESTING ADD/CHANGE	TEST 2
C081	CHANGED TESTING ADD/CHANGE	TEST 2
A082	ADDED TESTING ADD/CHANGE/DELETE	TEST 2
C082	CHANGED TESTING ADD/CHANGE/DELETE	TEST 2
D082	DELETED TESTING ADD/CHANGE/DELETE	TEST 8
D100	DELETED LAST MASTER RECORD	TEST 2

BEGIN TEST

CHANGE NOTICE C010	CHANGED	TEST 1
MASTER OUT C010	CHANGED	TEST 1
MASTER OUT M020	TEST DATA	OLD MAST
MASTER OUT M030	TEST DATA	OLD MAST
MASTER OUT M040	TEST DATA	OLD MAST
ADD NOTICE A048	ADDED	TEST 1
MASTER OUT A049	ADDED	TEST 1
DELETE NOTICE M060	TEST DATA	OLD MAST
MASTER OUT M080	TEST DATA	OLD MAST
MASTER OUT M070	TEST DATA	OLD MAST
MASTER OUT M080	TEST DATA	OLD MAST
CHANGE NOTICE C090	CHANGED	TEST 1
MASTER OUT C090	CHANGED	TEST 1
MASTER OUT M100	TEST DATA	OLD MAST
ADD NOTICE A110	ADDED PAST MASTER END OF FILE	TEST 1
MASTER OUT A110	ADDED PAST MASTER END OF FILE	TEST 1
END TEST		
OLD MASTER 10 RECORDS		
ACTIVITY 8 RECORDS		
NEW MASTER 11 RECORDS		
NORMAL END OF RUN		

LISTING OF SEQUENTIAL DATA SET

C010	CHANGED	TEST 1
M020	TEST DATA	OLD MAST
M030	TEST DATA	OLD MAST
M040	TEST DATA	OLD MAST
A048	ADDED	TEST 1
M050	TEST DATA	OLD MAST
M070	TEST DATA	OLD MAST
M080	TEST DATA	OLD MAST
C080	CHANGED	TEST 1
M100	TEST DATA	OLD MAST
A110	ADDED PAST MASTER END OF FILE	TEST 1

The listings above show the organization of the Heiser test structure. The list on the left shows the input files for all five tests and the change files for tests one and two. On the right is the running of test 1 with copies of all input. Underneath is a printout of the final master file. Comparing this data to the original on the left can determine, for instance, whether the system did really add A110 onto the master, instead of closing the file prematurely.

Only Use and Misuse of Data Concerns Policymakers

(Continued from Page 15)

• Fourth, we must add our two cents' worth to privacy policymaking. There are many reasons for doing this including: (1) everyone else is, and they are all less affected than we are; (2) our vantage in the storm's eye gives us a unique and valuable perspective; and (3) self-interest.

Our involvement should take two forms. On the one hand, we should develop positions of our own and advocate them vigorously.

On the other, we should monitor and evaluate the positions and proposals of others and come forth with support, objections, or counterproposals as we may deem advisable.

Three Initiatives

• Fifth, we must act quickly and firmly with respect to those privacy initiatives that are rapidly taking shape and which hold grave implications for our profession and technology. Three that were discussed initially in the first of these articles stand out.

Privacy plans or impact statements appear to be a fallout of the environmental problem, but unless these are a straight reporting of a system design, description or operation (facts about what we are doing or intending to do) they will become an exercise in speculation.

Equally unsettling about privacy statements is the implication that they may become a vehicle for certification. That is, if a privacy statement is submitted to some authority for approval, as opposed to mere public notice, then the approval constitutes a "stamp of approval" or certification.

This raises all sorts of questions: Would certification remove or limit liability unless a plaintiff can prove negligent or malicious conduct? What actions invalidate the certification and force recertification?

Change is a motif of our profession. What greater inhibitor of change can you imagine than certification?

Another initiative is the sensitivity categorization of information about individuals. Last week I asserted not only is this a mistake viewed in terms of economics and technology but, more important, it is ethically wrong.

I urge us to come forward and say that, insofar as we and our systems are concerned, all personal information is sensitive and that we propose to treat it with the maximum of dignity, respect and confidentiality that our professional skills and technology allow. This means that all personal data held by us will be confidential and safeguarded in our handling from anyone who lacks authorization to know it.

I believe that we can and should encourage our users and managements to adopt a similar attitude. Users who are very careful about some personal data and less careful about others do themselves, us and our organizations no good.

It is probably apparent that the logical extension of this approach is that personal data must be controlled on an element level and that our data systems must relate individual users or groups of users (e.g., "payroll clerk") to individual data elements. I submit that this is little more than an extension of the established concept of authorization tables.

Finally, those good words "accuracy," "completeness," "timeliness," "relevance" and "pertinence" are becoming the planks on which we shall stand or fall. Definitions of these terms that may seem reasonable to others may seem entirely unreasonable to us, and vice versa. Our views on this are as meaningful as those of anyone else.

It is good to note that some organizations such as Afips have launched privacy projects. However, the professional organizations that speak for most of us are the user groups, and they must either assert their leadership or relinquish any claims to be more than technical interchange forums. I, for one, call upon them to act.

Schneider is an information systems specialist in Washington, D.C.

Letters to the Editor

'Justifiable Indecision' Can Produce Flexibility

In a letter to the editor in the Sept. 11 edition of *Computerworld*, Pat Jacobs attacks what he or she feels is the indecisiveness of users in asking for "maybe" branches in instruction sets ("Playing '20 Questions' Not a Favorite Game").

The letter indicates a lack of sympathy for the computer user's plight. In the old days of manual systems, after all, he could (to use Jacobs' example) switch from decorating his hash totals with asterisks to garnishing them with pound signs to dropping them altogether; he had only to ask the clerk responsible for preparing the report. To make any change, he did not have to file a request with an overworked programming department and wait a year for implementation.

It's not unreasonable for users to refuse to be tied down to one mode of processing only; flexibility is supposed to be a by-product of computerizing their operations.

This writer's experience with justifiable indecision is that it *can* be incorporated into systems, if not instruction sets. Simply delay the day of reckoning until run time; then have the user code one or more parameter cards containing his decisions on such things as whether only error transactions or all transactions will be listed, whether updates will or will not be made to a master file and so forth.

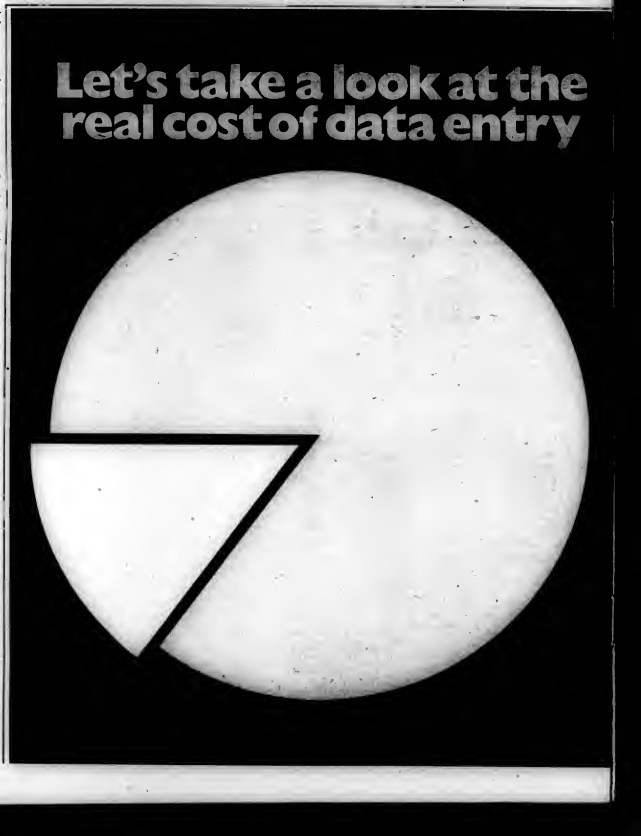
Of course, it would be ridiculous to include binary headings as a parameter, but if I understand Jacobs, such things are meant as exaggerations.

The technique is in common use. But its applicability is limited only by the imagination of the analyst and computer time.

For instance, a company maintaining several different mailing lists with differing formats, selection criteria and output requirements can write a general-purpose program controlled by specifications as to field characteristics, selection and print layouts. This writer has implemented such a program on an 8K 1401.

It may be said that extensive generalization "wastes" computer time. However, the real cost to the firm represented by indecision (or a genuine desire to have a flexible system) can be reduced by generalization; this is no waste of time. DPers must realize they are underusing the computer if they are as rigid as Jacobs seems to be.

Edward G. Nilges
Systems Analyst
Northwestern University
Evanston, Ill.



Centralization and Privacy Cannot Easily Coexist

By R.H. Trenbeath
Special to Computerworld

Observing the continuing arguments for computer consolidation of resources and recognizing the present significant public and governmental reaction to the rights of privacy for the individual issue, I must express my belief that these two ideas are in theory mutually exclusive.

Viewpoint

It is postulated that consolidation saves money, but this savings comes only at the expense of compiling or conglomerating information and data on individuals into more and more concentrated centers where there is a distinct possibility that information will be combined and used in a manner detrimental to the individual's right to privacy.

Technicians continually state that there are "surefire" or "foolproof" methods for securing the data so only authorized persons may access it. However, I feel there are two basic arguments against this reasoning.

The first hinges on the definition of authorization and who has the responsibility for approving requests for data. Organizations which accumulate data tend to view their information proprietarily and as though it exists in a vacuum.

In many instances, the data is a means for fulfilling an organizational goal or objective and the cost to an individual's privacy is not considered a constraint. The attitude is that the more data accumulated on an individual, the better.

The second argument is centered on the premise that if someone can develop a security system, someone else can break it. The increased number of users consolidated within one data processing resource center increases the probability that someone can and will penetrate any security precautions which might have been taken. This is especially true at the software level.

It is true that these arguments can be made against nonconsolidated centers; however, the more users contained within a center, the greater the probabilities that two or more of the users will find a "common data base" and decide to "authorize" the data usage by other parties or that one user may penetrate another user's security system.

However, mere consolidation vs. nonconsolidation is not enough. Commissions, laws and other mechanisms must be provided to allow the methods for the individual to control the collection and distribution of personalized data. Security systems must not only be developed and implemented, but also tested, audited and continually inspected for leakages and penetrations.

The real controversy is: Are we willing to pay the costs to society of an individual's right to privacy in order to save the dollars associated with the consolidation of computer resources?

Consolidation is basically a good concept, but the decision of whether to consolidate must be based on much more than the minimization of expenses. The answer is to insure the individual's right to privacy and then to optimize costs.

Trenbeath is information systems director for the Office of Administrator for the Courts, Supreme Court, State of Washington, Olympia, Wash.

Letters to the Editor

DP 'Professionalism' Aided Best by Humility

Re the letters to the editor from Fred Twepesta and Harold Estes [CW, Sept. 18] on the pros and cons of the Certificate in Data Processing (CDP):

Twepesta said it very well, and in his own way defined "professionalism." His company is fortunate in that his first concern is "concentering on the needs of his company, keeping abreast with new technology" and, above all, he hasn't forgotten who pays his salary!

His letter was genuine, simply stated and to the point. This man no doubt speaks for many DP managers, and I for one agree.

Just how much technology does a manager need to be sanctioned by the Certification Council to be classified "professional"?

Twepesta is kinder yet in requesting some consideration for, the little guy. I can see it now, CDP-1K, CDP-2K, CDP**** and so on.

Estes, on the other hand, challenges all comers "to join the DP professionals and CDP holders (why the distinction here evades me) in advancing the DP profession and in providing the public with a new attitude toward DP.

I cannot help but compare the two writers. One requests humble consideration, the other demands recognition, licensing and public respect.

The Estes approach suggests we all change the public attitude toward DP by starting from the top. Recognition as professionals through certification.

The Twepesta approach speaks for itself, and I'll wager it will do more to further the cause of professionalism. It all begins and ends in the company with DP facilities.

Concentrate on the company's needs, and the individual will be recognized. The company, the public trust and the DP organizations will all benefit.

Take the CDP if you want to, but like the CPA – it does not fit everyone.

D.G. Bauman
Potlatch Corp.
Pittsburgh, Pa.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Letters to the Editor

Article Shed More Heat Than Light

An article I wrote entitled "Raw Count of Instruction/Day May Reward Poor, Not Good Code," was printed in the Aug. 21 issue. It was written in the hopes that other and more improved methods of measuring programmer performance be developed or made known if anyone has such a method in his or her head or in actual operation somewhere.

I had hoped my article would generate some discussions that would shed some light on this subject. It appears to have generated more heat than light.

The Sept. 25 issue contained a rebuttal to my article from J.A. Morin of NCR in Denver. He appeared to be somewhat upset with me, rather than the problem I presented for discussion.

Before we start, let me state that I do not advocate changing or abandoning the use of the instruction/day count. It is all we have and it is useful when used properly. My article was written in hopes of getting other methods to use in addition to and in conjunction with the current method.

Morin said the article is a classic example of "stating a problem that is obvious without offering any solution." This problem isn't so obvious, because every day we see costs and budgets being prepared, proposals being written and performance measured solely on the basis of instructions per day alone. Some people use it as if it were absolute truth.

There is no other general method to use in conjunction with this one. My article was a call for help to see if other techniques could be developed and implemented to add to the one in use today.

I have seen cost estimates from two different organizations vary from $70,000 to $750,000 for the same programming job. Clearly something is missing here when such disparities can occur. (The final cost was approximately $60,000.)

As for his statement that "DP types have been accused of being bad managers," etc., my article was not intended to imply any criticism of DP management in general or particular. In my experience, these managers are no better or worse than managers in any other discipline. I think the general rule that only about one in 10 people in any working environment is capable of managing others is true here as well as anywhere else.

Morin also suggested some sort of weighing factor be applied for program complexity. Who does this? How is it done?

It would be very interesting if Morin could find the time to write at some length about this technique. This may be what we are after, another method to use in addition to the current one to plan, to monitor work in progress and be able to determine what was a "good or bad" programming job and what it should cost.

In Morin's last paragraph, he stated that "the elementary considerations needed to cope with the minor problems mentioned by Delaney are obvious." It is not obvious to me or I wouldn't have written the article to ask for other peoples' thinking on the subject.

The Federal Government thinks it is a valid, serious and continuing problem to the point that a major seminar was held in early October on this subject at Hanscom Air Force Base, Bedford, Mass., in an attempt to study, modify and improve current, obviously inadequate methods.

William A. Delaney
President
Analysis & Computer Systems, Inc.
Burlington, Mass.

IBM's 8% Rental Increases Confusing and Inflationary

It is interesting that IBM has the ability to raise by 8% the rent of equipment which has already been produced [CW, Sept. 25].

This is bewildering. The money has already been spent and the only cost by IBM on this equipment relates to maintenance and software, which IBM acknowledges as only three percent due to its unbundling.

It is my feeling that IBM should be required to maintain the purchase price base for all installed machines. This is historical and has nothing to do with any future increases in costs, which IBM is saying.

It is obvious that IBM probably should charge 8% increases for the future on equipment for rental and purchase prices, but historically there has been no increase other than the 8% relating to maintenance and programming costs for software. Since IBM is unbundled, there shouldn't be much in the way of programming cost increases.

Therefore, the present users of IBM equipment should only have the 8% increase related to maintenance added to their rental prices. Why should costs of the past that have already been expended be charged to current rental customers? A retroactive cost increase is not in order.

How does IBM explain this? We recognize that IBM has increases in internal operating costs but it does not acknowledge that these costs are for sales and marketing.

IBM, when it prices equipment, looks at a five year projection. It takes into consideration inflation, the number of units to be produced, a sales and marketing effort, materials and profits.

The current 8% increase in cost to users of IBM equipment definitely indicates that IBM is asking the current rental customer to contribute to IBM profits. Profits are the only thing that IBM asks the rental customer to produce.

It appears that IBM's inroads into fixed-term leasing is one to "lock out other competitors" by guaranteeing future profits for a fixed period of time.

It is my belief that IBM should increase costs in relationship to actual increases. IBM never gives a cost-of-living increase to any of its employees but only offers merit increases to them. Why should the IBM Corporation be asking for inflationary increases in its products from everybody who has taken on such products, based on IBM's recommendations and prices in the past?

This is a major inflationary announcement of IBM's which should be immediately rolled back for everybody who is a current renter and user of IBM equipment. It is clear that the corporations of the U.S. are fearful of offending the IBM Corporation. This is because it is the greatest monopoly in the universe.

Thomas E. Doyle
Summit, N.J.

Random Notes

'Cotune' Update Includes Verb-Level Cobol Analysis

PHOENIX – Verb-level support (in addition to analysis by sentence and paragraph), a summary of I/O usage by device and a map of resources consumed by the system and by each Cobol module are among the features of the enhanced Cotune II package from Capex Corp.

Cotune and Cotune II analyze a Cobol program's execution to show which paths of the program have been exercised and where CPU time has been used.

The analysis package is designed for IBM OS/360-370 and is available for $5,750 or $275/mo under an annual lease arrangement. Capex is at 2613 N. Third St., 85004.

Minis Start Business DP Chores With Independent's Routines

HOUSTON – Installations moving to Basic-based minis may be able to utilize a part or all of a series of utility programs developed by Dedicated Online Systems.

The collection includes a text editor, an input analysis routine and a set of fast decimal precision modules.

A management information system that manages sorts, updates and report formatting is also available, the vendor said.

The editor costs $500; the free format input analysis, $150; the fast decimal precision, $350; and the MIS support, $2,500 from the firm at 2610 Southwick Drive, 77055.

'Staff' Handles Statistics, Dollar Data For Hospitals

NORTH HOLLYWOOD, Calif. – The Statistical and Financial Data Facility (Staff) package, intended to provide a comprehensive general ledger and financial reporting system for hospitals and other health care organizations, is now available from Occidental Computer Systems, Inc.

Staff generates reports covering both occasions of service and other statistical information and financial data.

The Cobol system for IBM mainframes can be purchased for $12,600 from Occidental at 11311 Camerillo St., 91602.

NCR Moves Industrial Tasks To Smaller Disk Subsystems

DAYTON, Ohio – NCR has modified three industrial software packages – a bill of materials processor, a material control application and an inventory material requirements system – to operate on 32K Century CPUs with NCR 656-102 disk units. Previously they required larger NCR 657 disks, the company noted.

The new software is free to Century users, except for normal maintenance and support charges.

Can Cobol Cope With Structured Logic?

By Don Leavitt
Of the CW Staff

NEW BRUNSWICK, N.J. – In a move that breaks a tradition of rather careful interfaces with the general DP community, the Conference on Data Systems Language (Codasyl) Programming Language Committee (PLC) has issued an appeal to anyone interested in and able to help it come to grips with "structured programming."

The committee has invited authors to submit papers on either of two topics. Perhaps significantly, the first topic cited in the call for papers asks the question: "What changes should be made in the Cobol programming language to make it more amenable to structured programming techniques?"

The other topic is "How to Write Structured Programs in the Cobol Language as It Exists Today."

An unspecified number of papers from both topics will be presented at a symposium (titled "Structured Programming in Cobol: Future and Present") now being planned for Los Angeles on April 7.

The major objective of the presentations, a committee source said, is to aid PLC in its development of Cobol.

The fact that the call for papers omitted a definition of structured programming suggested to one observer that PLC is searching for help on that basic question as well.

The stress on the future in the symposium title suggests that PLC "suspects" current Cobol cannot meet the challenge of structured programming and is open-minded about what changes are needed, he added.

The committee selecting papers for the symposium will include PLC chairman R.J. Ham of Honeywell, PLC cochairman M.L. O'Connell from Digital Equipment Corp. PLC member H.P. Stevenson from Bell Labs and Share Cobol project manager J.W. Lowrey Jr. from McDonnell Douglas Automation Co. Stevenson and Lowrey are cochairing the symposium.

Potential authors have been asked to submit a letter of intention, including an indication if the paper to be submitted may be published, to Stevenson at Bell Labs, Room 4C-820, P.O. Box 2020, here in New Brunswick, 08903.

An abstract of not more than 150 words and five double-spaced typed copies of the paper (not to exceed 5,000 words) should be submitted to Stevenson by Jan. 15.

All submissions will be acknowledged, and authors whose papers are accepted for presentation at the symposium will be notified by March 7, he said.

Reflecting the working nature of the symposium, PLC has said that it will be open to anyone interested but that attendance will be limited to 100 participants.

Requests to attend should be made before Feb. 1 to Lowrey at McDonnell Douglas Automation, 3855 Lakewood Blvd., Long Beach, Calif. 90846.

'TSA' Eyes User, System Code Action

SUNNYVALE, Calif. – The Total Systems Analyzer (TSA) software from Boole & Babbage, Inc. (B&B) provides IBM OS/360-370 users with an enhanced version of B&B's Problem Program Evaluator (PPE) and a level of application program monitoring that has not been available until now.

TSA is a breakthrough in the monitoring field, the vendor explained, since task program monitors (including the company's own PPE) have tied themselves to one program at a time rather than having the capability to monitor the entire system.

In both its older stand-alone packaging and as part of TSA, PPE samples the execution of a particular program, recording and then reporting such things as the percentage of time spent in each section of the user's coding.

The purpose of this type of monitoring is to identify the heavily used sections of code with the aim of optimizing those sections.

TSA supports the continuation of problem program monitoring from one program to the next. TSA samples systems and problem program reports to aid the user in locating and optimizing the high activity areas in his modules.

TSA can monitor system activity of IBM's OS or any of the supportive subsystems: Hasp, Asp, TSO, IMS or teleprocessing monitors, as well as the user's programs, over time. This data can be summarized to find the percentage of total CPU usage "chargeable" to each module.

CPU usage of each module can also be plotted over time to find its peak usage. Finally, the same data can be reduced further as input into the PPE portion of the new analyzer to find where the CPU spent its time within the module.

TSA operates as a high priority systems task requiring 12K of memory. It has been implemented to run with "real" MFT or MVT environments or with either OS/VS1 or OS/VS2 R1 systems.

The monitor can be acquired by new customers for $13,000. Current users of purchased PPE packages will be allowed full credit for the cost of the earlier software toward the cost of TSA.

The company is at 850 Stewart Drive, 94086.

Hotel Applications Built on Datashare II

CHARLOTTE, N.C. – The time-shared Datapoint 2200-based Fast-Inn software from Fast, Inc., developed primarily for the hotel/motel industry, appears adaptable to the basic accounting needs of other industries as well.

Phase 2 of the package can be used by itself, and it includes payroll, accounts payable, accounts receivable, general ledger and financial statements.

The payroll subsystem includes tax calculation and recordkeeping for as many as 10 states and these routines are generally maintained by Fast.

Changes to the other subsystems might be needed before they could be used by nonhotel shops, since the basic coding includes processing of credit card transactions and other rather specialized problems, the company said.

Fast includes 20 hours of modification work in the price of each phase of the package, a spokesman added.

The first phase of Fast-Inn applies more directly to hotels and motels, with some potential for other businesses requiring reservation facilities. The system "allows future reservations to be made a century in advance," the spokesman noted.

Immediate access to any reservation by name and date is included, as is the ability to display room availability information for any given date. Complete room billing, check-in, check-out, housekeeping and night audit reports make up the rest of Phase 1, Fast added.

Implemented on a 16K Datapoint 2200 under the Datashare II time-sharing executive, the system will be upgraded to Datashare III "as soon as Datapoint formally releases that version." Currently Fast-Inn (and Datashare) can support as many as eight terminals or other I/O devices operating simultaneously.

Phase I is available for $625/mo under a two-year lease, after which the price drops to $300/mo. Maintenance after the initial two years will cost $45/mo, Fast said. Phase 2 can be leased for $485/mo, dropping to $230/mo after two years. Maintenance for this portion of the Fast-Inn system is $25/mo once the basic lease period expires.

Fast is at 650 State St., 28208.

T/S Programs Go In-House

WAKEFIELD, Mass. – Users with large-scale, in-house time-sharing systems may be able to avoid much of the cost and uncertainty of developing application programs by getting them "off the shelf" from Sofco, Inc.

Initially supporting Decsystem-10 users but moving toward the IBM TSO environment, the company is acquiring the rights to market, on a lease or sale basis, programs now running on commercial time-sharing networks.

Since the programs are already operational, Sofco said purchasers can be confident even though the software may have been developed by many different, often small software houses.

Major areas covered include data base management, financial planning and reporting, customized business-oriented systems, program debugging and utility packages, statistical analysis routines and engineering applications, a spokesman said.

The data base management area includes Imars, developed by the Bedford Group, and others are expected to be included shortly. Financial support packages include Basic Business Language and Profile, both from Core & Code. The Rapid Interactive Debugger (Raid) from Ross Scott Associates and Fife of Files (FOF) and Debugging Executive (DEC) from the Bedford Group are also in Sofco's inventory.

Sofco is at One Lakeside Office Park, 01880.

Private JCL Libraries Used 'On the Fly'

SUNNYVALE, Calif. – Each user on an IBM OS-based system is said to have access to his own procedure library for cataloging and executing Job Control Language (JCL) instructions with the Easy Reader package now available from Subsystems, Inc.

The "care and feeding" of these private libraries can be managed by DP support personnel well below the level of the system's programmers usually required to work with JCL, the vendor claimed.

While OS, as supplied by IBM already includes facilities for private "proc libs," Easy Reader is "safer" since it does not require user-managed linking of the private libraries to the system-maintained "proc lib." Nor does it require system library updates, Subsystems said.

The package is said to be compatible with all releases of OS, although it hasn't yet been used in a VS environment.

Functionally, it allows the use of any partitioned data set in the system as a procedure library. Any number of user procedure libraries can be made available, and up to 15 can be used for any one job, the vendor said.

In operation, the insertion of one PROCLIB DD statement into a jobstream dynamically links the system library to the user's and allows use of procedures from the private libraries. If there is no PROCLIB DD statement, Easy Reader uses the system-maintained JCL by default.

Subsystems' package works directly with the OS reader/interpreter function and may be core-resident or transient depending on how the installation handles that function. The utility takes an hour of programmer time and 15 minutes of machine time to install, the spokesman said.

The package is available for $1,000, under license, from Subsystems at 790 Lucerne Drive, 94086.

'Capflo' Solves Distribution Problems

DENVILLE, N.J. – The Capacitated Facilities Location (Capflo) system has been designed by Haverly Systems, Inc. to provide an economical means of solution to physical distribution problems and a "user-oriented" manner of data input and report output, the vendor said.

The algorithms can be applied to almost any distributor with virtually any type or number of commodities and intermediate points to be serviced, a spokesman added.

Capflo has two basic phases. First, for a given set of facilities and a set of customer demands, the system allocates customers to facilities in order to satisfy customer demand, keep within the maximum throughput allowed in each facility and produce the least-cost distribution pattern.

The second phase involves dropping facilities in order to save on fixed costs. This stage should result in an even "less cost" solution to the problem, with lower fixed costs offsetting the slightly higher variable costs that occur as transportation lines get longer, the company said.

Capflo has been extremely efficient in solving multicommodity distribution problems and provides the user two separate approaches to the solutions; in addition, the system can handle two- or three-stage transshipment problems.

The system is said to take into account the costs associated with various transportation modes so that, when the form of transportation is important, it can be managed properly.

Capflo utilizes whatever memory it can, dynamically assigning it to optimize the solution of the problem. It has solved in a production environment many "respectably sized problems," including one with 50 facilities, 600 zones, three levels, 8,000 costs, six product groups and 20 side constraints, Haverly claimed.

The system operates under DOS or OS on IBM 360 and 370 equipment and, according to Haverly, "takes advantage of the Virtual System features." Written in Fortran IV, it can function in 175K.

It is available for an initial charge of $10,000 plus an annual fee of $1,500. Haverly is at 4 Second Ave., 07834.

Ledger System in Cobol Runs on 'Any' 32K CPU

RICHMOND, Va. – Systems Engineering Corp. (SEC) is offering a general ledger system written in Cobol which can be adapted to "any CPU."

Originally written in Honeywell Cobol, the system will run on any 32K and up CPU and is "ideally suited to a single middle-size company – an insurance company with $50 million in premiums, for example," a company spokesman said.

SEC is prepared to modify the code to ANS Cobol or IBM Cobol implementations at no additional cost, he added.

The system, which can handle up to 999 accounts, allows the user to retain his own chart of accounts. SEC's titles or descriptions can also be changed to suit the user's needs.

Department codes are 10 positions, and account numbers are basically three digits with two-digit suffixes to identify subaccounts.

The system generates daily financial statements, monthly general ledger reports, and both cash and accrual-based accounting reports.

On a daily basis, the user may request a trial balance as of the current date and an end-of-the-previous-month balance.

The system includes a report writer that can generate custom-tailored reports based on the users' parameters as coded on a simple worksheet.

Geared to batch processing mode, the program requires a card reader, tape storage, and a disk such as the IBM 2311, in addition to the 32K CPU.

For a purchase price of $5,000, the spokesman said SEC can install the system on a turnkey basis and provide complete source code and documentation.

The firm is at 700 E. Main St., 23219.

'Dossier' Marketed by GBA

Developed originally by Robin Shaylor of Portland, Ore., Dossier, a DOS/360 core-image library analyzer that "tells programmers what they did, not what they thought they did," is now available from GBA International, 2670 Leavenworth, San Francisco for $750.

Business School Doctoral Plans Avoid DP Stress, Survey Finds

Less than half of doctoral programs in business administration, but more than 70% of undergraduate and masters level programs, require computer proficiency of students.

These results were revealed in the triennial survey of computer use and computer curriculum in schools of business, conducted by the *Computing Newsletter for Schools of Business* and funded by Hewlett-Packard.

J. Daniel Couger On Education

The survey was made of schools accredited by the American Assembly of Collegiate Schools of Business (AACSB). Responses were received from 118 of the 161 accredited schools. Surveys were also conducted in 1966 and 1970.

The impact of computer deficiency in doctoral programs is significant. Even though 72% of undergraduate schools now require students to attend an introductory DP course, these students are later taught their major subject areas by faculty who are unable to demonstrate the value of the computer in that discipline. The student exits the introductory course all primed to use the computer but finds little encouragement for use of these new capabilities in subsequent courses.

Adding to the problem, IBM has decided to discontinue funding special summer programs to educate faculty concerning the computer. Tom Schriber of the University of Michigan and I have taught these courses at our respective universities over the past five years.

Through these programs, faculty from more than 300 schools have acquired a capability of using the computer in teaching and research. Participants come from all disciplines within the school of business: accounting, finance, production, marketing, organizational behavior, etc.

Through these programs we were able to combat the absence of computer content in doctoral programs. Even though 44% of the respondent schools now require a computer proficiency of doctoral candidates, compared with 29% in 1970, the lack of computer proficiency for the majority of the faculty will continue to exist.

The only consolation is that frequently each fractional area has at least one professor who can demonstrate the computer's value in that discipline. Rarely, however, is it possible for that person to have contact with all students majoring in that field.

Improvements in Computer Use

Despite the deficiency at the doctoral level, the overall curriculum is much more computer-oriented. The school of business has become one of the principal computer users on the campus: the school ranks as one of the top three users on 72% of the campuses surveyed. It was the number one user on 23% of the campuses.

Comparison of School of Business to Other Users (in $)

Rank Among All Campus Users	Percent of Schools
1st	23
2nd	22
3rd	27
4th	11
5th	6
6th – 10th	6
Other	5

Cost of computer use is decreasing compared with 1970. Expenditures at that time ranged from 1% to 37-1/2% of the total school of business operating budget; 22% of reporting schools utilized more than 19% of the total budget for computing.

In the 1973-74 school year, only 2% spent more than 19% of the budget for computing; 86% of the schools spent less than 9%, compared with 70% in 1970.

It is significant that only 49 schools responded to this portion of the questionnaire. The other survey participants replied that their cost system would not readily permit identification in the categories we requested. One of the principal reasons is the increased degree of centralization for computing.

Four-Phase Plan

In 1966, only 11% of AACSB-accredited schools required computer programming proficiency of students at the undergraduate level. Now the majority of schools require a four-phase computer curriculum. So despite the doctoral-level deficiencies, overall capability of students emerging from U.S. schools of business is much improved since 1970.

The four-phase curriculum is as follows:

1. Coverage of computer fundamentals, systems analysis/design and programming through a course required of all students early in their academic programs.

2. Coverage of the applications of computers through incorporation of this material into the functional area courses, e.g., computer applications in finance in the finance courses, computer applications in marketing in the marketing courses, etc.

3. Coverage of computer capabilities for abetting decision-making in a dynamic business environment through computer-oriented business games.

4. Coverage of integration and optimization of computer applications through a course on design and implementation of a sophisticated, computer-based management information system.

Couger is professor of Computer and Management Science at the University of Colorado.

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Bits & Pieces

Spur Controller Allows Use Of 1403 Printers on 1130

SANTA MONICA, Calif. – The Spur Products S1403/1130 controller allows IBM Model 1403-N1 or N3 printers to be operated by IBM 1130 or Digital Scientific Meta IV computers.

Both computers were designed to operate with IBM 1403-6 or 7 printers, which print at 600 line/min compared with the 1,100 line/min rate of the N1 and N3, the firm noted.

The controller costs 40% less than the IBM multiplexer and adapter needed to interface either computer to the slower 1403 models, Spur Products said.

The S1403/1130 controller costs $18,000 installed. The firm is at 2928 Santa Monica Blvd., 90404.

Memorex Disk System Attachable To IBM Mass Storage Facility

SANTA CLARA, Calif. – Memorex has announced that its 3670 and 3675 disk drive modules will be attachable to and directly supported by the new IBM 3850 mass storage facility [CW, Oct. 16].

These Memorex disk drives are compatible with IBM 3330 disks. The Memorex disk modules will be attached through the Memorex 3673 disk controller and will include support of string switching capability.

A Memorex spokesman explained that "because IBM normally expects at least a five year useful life from a product of this type, it is reasonable to assume that the mass storage facility also will be supported on IBM's next generation computer, often referred to as Future System (FS) as the primary mass storage device. "Because this new device supports only 3330-type technology, IBM has, in effect, confirmed that the 3330 is IBM's primary rotating memory device for large computers for the next several years," he added.

Cleaner Handles 6,250 Bit/In. Tapes

BURLINGTON, Mass. – Computer-Link Corp. has introduced a magnetic tape evaluator/cleaner that can accommodate 6,250 bit/in. 7- and 9-channel density formats, as well as 800 bit/in. and 1,600 bit/in. tapes. Speed is 180 in./sec.

Called the Series 1000, the device cleans, tests, classifies and repairs magnetic tapes, according to the firm.

The Series 1000 costs $9,000 from the firm at 14 Cambridge St., 01803.

Correction

Regarding the article on Itel's Super 50 computer [CW, Oct. 16], Itel said it modified IBM's DOS/VS to operate on the 360/50. In addition, the disk speed on the 3330-type drive attachable to the 50 is 2,800 rev/min and the speed on the 3330 itself is 3,600 rev/min.

OCR, Keypunch, Key-Disk Users Surveyed

Datapro Explodes Some Data Entry Myths

By Fonnie H. Reagan Jr.
Special to Computerworld

DELRAN, N.J. – The life of an "authoritative source" at a research organization is not an easy one, since periodic revaluation of "pet theories" is necessary to make sure technology and current usage have not passed them by.

Datapro Research Corp. has found that asking subscribers about their equipment usage and degree of satisfaction helps keep analysts from defending their pet theories beyond their usefulness.

Datapro ran a survey on optical readers in early 1974 and did another on key entry equipment this summer. Let's use this information to reexamine a few pet theories on data entry.

Pet Theory Number 1: Keypunches are mechanical monstrosities that are not reliable.

Our subscribers' experiences with over 2,700 keypunches do not support this theory. A total of 88% of the responses rated the hardware reliability of all types of keypunches as excellent or good.

The users rated the more modern, buffered keypunches better: e.g., the IBM 129 and Univac 1700s achieved over 90% excellent and good ratings. Users rated key-to-disk systems at about the same level of hardware reliability; i.e., 89% excellent or good.

Pet Theory Number 2: Key-to-disk systems outperform keypunches by a substantial margin.

The traditional "average" throughput from keypunches is 1,000 card/day. Key-to-disk systems are supposed to be able to do much better. The experience of our users tends to confirm this theory, but not by as much as expected.

The throughput results for keypunches came close to the traditional: 58% of the users reported keying rates of 1,000 card/day or under. A total of 75% of the key-to-disk users reported keying rates of over 1,000 record/day per keystation.

However, we suspect that many of the keypunch users who reported very low keying rates of only a few hundred or so cards per day were using their equipment for source program or JCL preparation or

(Continued on Page 24)

GA Builds 4 Systems Around SPC-16 Mini

By CW Staff Writer

ANAHEIM, Calif. – General Automation, Inc. (GA) has introduced four computer systems built around its 16-bit SPC-16 minicomputer.

The models include the DM 120 remote job entry (RJE) workstation; the turnkey DM 130/2 system designed for small, first-time users; the DM 130 satellite processor system; and the top-of-the-line DM 140 multiuser central processing system.

The four machines are compatible with one another and can communicate with IBM 360/370s, GA said.

The user can select a system using one of several new operating systems, a file management system; and a library of software including financial analysis, operations research and statistical capabilities, the company noted. There is also a report generation package.

The DM 120 RJE workstation communicates from 1,200- to 4,800 bit/sec. A typical system includes a 16K SPC-16/65 processor, a CRT workstation, a 300 card/min reader and a 125 line/min printer for $25,000, the firm stated.

Like the other models in the series, the DM 120 is available for delivery in 30 days.

Free-Standing System

The DM 120 is field-expandable to a DM 130, which is a free-standing system that can support up to four CRTs operating concurrently in the foreground or can perform batch compilations or communications in a background mode, GA explained.

A minimum DM 130 includes a 24K SPC-16/65 processor, a 165 char./sec printer, a 10M-byte disk and one CRT workstation for about $42,000.

In expanded configurations, the 130 will support up to four CRTs in a multiprogramming/multitasking environment, a 1,000 card/min reader, 600 line/min printer and up to 400M bytes of disk storage.

The lower-priced DM 130/82 is a dedicated small business system available only on a turnkey basis from a network of distributors. The system consists of two to four CRT stations, a 165 char./sec printer and a 10M-byte disk memory.

The most powerful member of the DM 100 series is the DM 140, which can support up to 32 remote CRTs while the background handles concurrent compilations or communications, GA said.

A minimum DM 140 includes an SPC-16/65 with 32K of memory, a 300 card/min reader, a 125 line/min printer, 10M bytes of disk storage, a CRT operator's console and a concurrent foreground/background operating system supporting public programming and peripheral spooling for $61,000.

360 Third-Party Lease Stretches User's Throughput, Not Budget

TORONTO – In these days of tight money and tough controls over inflationary budgets, it is still possible for a savvy DP manager to improve his department's performance and throughput – without adding costs.

In a single month this summer, Dominion Cellulose Ltd., the Canadian producer of Facelle paper products, was able to increase its throughput by 70% at no increase in expenses.

"There was no question that we needed more power," Dominion's DP manager William Hogg stated. "On our large weekly and monthly runs we were taxing our 360/20 to its capacity.

"However, any improvements that we made had to be within the limits of our existing budget."

The solution was a third-party lease with Dearborn Computer Leasing Co. on a 64K IBM 360/30.

Dominion was using a 32K 360/20 with four 2311 disk drives, two 2415 tape drives, a 1442 card punch, a 2501 card reader and a 1403 printer. Using IBM's Disk Programming System (DPS), the company also had a combination of Assembler, RPG and a small number of PL/I programs.

Dearborn proposed that Dominion retain its tapes and printer but convert its other equipment to a 64K 360/30 with three 2314-equivalent disk drives and a 2540 card reader/punch.

The deal required Dominion to sign a three-year lease, but at the same monthly cost it was paying on a rental/lease basis for the 360/20 system.

Using a Dearborn-supplied software package, Dominion was able to convert 600 RPG and assembler programs during the three months prior to the installation of the 360/30, Hogg reported. For one month both the 360/30 and 20 were run in parallel operation, and after passing this operational test successfully the 20 was discontinued, he said.

Dominion has since converted the two 2415 tape drives to a 2401-5, also at no increase in cost. The company has also added Dearborn's Power 1 disk spooler package and its DPS/RS software that is said to provide advantages in repartitioning, relocatability and compression of the Core Image Library.

Two Datapro Surveys Explode OCR, Key Entry Myths

(Continued from Page 23)

similar jobs, whereas the key-to-disk systems were utilized mostly in a production environment.

In general, information returned on the survey forms was insufficient to support or refute this pet theory, so it is safe for a while longer.

Pet Theory Number 3: Key-to-disk systems provide the capability for keying longer and more complex records than do keypunches.

In comparing results from questions probing usage of record length or record complexity, keep in mind that the figures presented here reflect usage rather than capability.

The key-to-disk users reported using record lengths of over 80 characters 49% of the time, with the vast majority (41%) falling into the 81- to 150-character record length. While this is impressive, remember that it means that 51% still used record lengths of 80 characters or less.

Keypunch users confined their record structure to two or fewer format levels 79% of the time on the average for all keypunches; for a buffered keypunch such as the IBM 129, this figure dropped to 64%.

Key-to-disk users, on the other hand, confined their record structures to two or fewer format levels only 19% of the time.

Format level usage of between three and five levels was achieved by keypunches about 19% of the time (average) or 32% of the time (IBM 129). Key-to-disk users employed three to five levels about 68% of the time.

The two parameters of record length and number of format levels taken together tend to indicate that users are taking advantage of the key-to-disk's greater capability for long and complex record structures, but that many are still confined to record structures designed under traditional keypunch limitations.

Pet Theory Number 4: Programmability provides a key advantage of key-to-disk systems over keypunches.

The programmability of key-to-disk systems is reflected in the software provided. We cannot approach this theory directly, but on the idea that software that doesn't work is worse than no software at all, we can report on users' satisfaction with the software provided.

A total of 73% of the users of key-to-disk systems replying rated the software as excellent or good. On the surface this looks like a favorable report. But, remember that it says that one out of four key-to-disk users rated the software as fair or poor.

It may be that users are expecting too much from programmable systems. It may be that key-to-disk vendors are overly optimistic about development times. It may be that the data entry environment is more varied than vendors expected. In any case, the software provided for key-to-disk systems is an important consideration for prospective users.

On the optical reader front, pet theories abound. One of the most prevalent is that typewriters and hand printing used in an OCR environment will replace all or most key entry devices. Again, this theory is too large to attack directly. We will look at some of the elements comprising the theory.

Pet Theory Number 1: Punched cards are on the way out and OCR will replace everything.

The evidence regarding this point is marginal. In our key entry survey, users were asked to state their plans to change from the approach used to another approach. A total of 54% of the keypunch users reported "no changes planned." Of the 46% reporting a plan to change, OCR received only 1% of the mentions. (Key-to-disk led the list with 20%.)

Of the optical reader users, only 28% reported using typewriters as a means for generating input documents. By contrast, about 60% of the OCR users used line printers to generate input documents.

A total of 50% of the users reported using hand printing to one extent or another, and 41% of the optical reader users reported using turnaround documents.

These results are inconclusive and a specific conclusion relating to the ascendancy of key entry or optical reading cannot be drawn. Both techniques have their proponents, and probably neither group is inclined to change.

Pet Theory Number 2: Optical readers are unreliable; devices handling flimsy items such as paper documents are prone to jam.

First, 81% of the users rated the readers excellent or good as pertains to overall performance. This is not a bad rating, but neither is it an outstanding one.

On the question of hardware reliability, 70% of the users gave ratings of excellent or good. Freedom from recognition errors received 76% excellent or good ratings; freedom from jams received 61% excellent or good ratings. (These two average out to just about the hardware reliability ratings, giving a good cross check.)

As a sidelight on the recognition error situation, 45% of the users reported a rejection rate of between 0% and 2%; 30% reported a rate between 2% and 5%; 13% of the users reported a rate between 5% and 10%; and 9% of the users reported a rate of over 10%. The total of 75% of the users reporting a rejection rate of between 0% and 5% can be correlated with some justification to the 76% of users rating freedom from recognition errors as excellent or good, to reach a working hypothesis that a 5% reject rate represents the upper limit of what users will treat as acceptable.

Pet Theory Number 3: Reading of large amounts of data from a single document (page readers) and the reading of intermixed fonts on the same document represent specialized situations.

A total of 31% of the users reported reading pages; a total of 20% reported reading intermixed fonts. In a related question, 30% of the users reported reading alphanumeric information.

A conclusion that can be reached from these figures is that while reading large amounts of diverse data from a document is not universal, it happens often enough to take it out of the specialized category.

Selection of percentile groupings and adjectives can be used to support or refute pet theories.

We have tried to take a reasonable attitude. The danger of accepting another's pet theories on face value is two-fold. One is that the theory may not be based on a reasonable interpretation of existing information. The second is that your situation may warrant flying in the face of "conventional wisdom."

The problem is telling the difference. To do this, the user has to know his situation well, he has to understand the environment of his information sources and he has to apply diligence in applying available information to the problem.

Reagan is a research director with the Datapro Research Corp.

Miniworld

CMI PDP-11 Add-On Gets Multiprocessing

BEDFORD, Mass. – Cambridge Memories, Inc. (CMI) has introduced a memory sharing feature that enables Digital Equipment Corp.'s PDP-11 minicomputers to operate in a multiprocessing configuration.

The feature, an extension of the company's dual port option on its Expandacore-11 add-on memory, enables more than two PDP-11 computers to be linked in a "daisy chain" configurstion while sharing a series of Expandacore-III memory units, CMI said.

In addition, the memory sharing feature permits access to any memory unit from any direct access (DMA) peripheral device used with PDP-11 processors.

Access to the dual port memory by one of the processors is said to allow independent operation of the alternate processor in the multiprocessor link with its resident memory and associated peripherals.

The memory sharing function of Expandacore-11, according to CMI, enables PDP-11s to achieve significantly higher processing power in such applications as data communications, data acquisition and data base operating environments. In many applications, a multiprocessor Expandacore-11 system allows the PDP-11s to outperform much larger computers designed specifically for the task, a spokesman said.

The dual port memory systems are expandable up to 120K words (with or without parity) in expansion increments of 8K or 16K.

The dual port feature permits attachment of a single Expandacore-11 to two Unibus data channels. It is this feature that enables the memory sharing operations to take place, CMI said.

Price for each of the dual port features used in the multiprocessor system is $1,875 per memory system. Expandacore-11 memories are priced approximately 40% below equivalent DEC memory modules, CMI said.

Flexible Disk Designed For DEC, DG Equipment

SANTA ANA, Calif. – Remex has introduced an IBM 3741-compatible flexible disk system for use with most Digital Equipment Corp. and Data General minicomputer models.

The RFS 7400 flexible disk system includes one to four flexible disk drives, a power supply, cables and formatter electronics. The system, which offers overlap seek, will simultaneously step four drives to new tracks, the firm stated.

The RFS 7400 costs from $2,695. The firm is at 1733 Alton St., 92705.

Series 620 Impact Printer Compatible With Varian Units

WOBURN, Mass. – Printer Technology, Inc. has introduced a plug-compatible printer for the Varian 620, V72 and V74 minicomputers.

Called the Series 620, the product is based on the firm's Printec 100 line of serial impact printers and consists of a 100 char./sec printer, Varian interface card, diagnostics and a 15-foot cable.

The printar can be supplied with either upper-case only or optional upper-case/lower-case character sets.

The Series 620 costs $4,750 from the firm at Sixth Road, Woburn Industrial Park, 01801.

Deltec UPS Backs Up Minis

SAN DIEGO, Calif. – Deltec Corp. has announced an uninterruptible power system (UPS) for minicomputers.

The firm's DSU 710 is a 700 VA on-line UPS that includes battery charger, battery reservoir and output inverter regulator. Output is an isolated 117 volts ac ± sine wave.

The DSU 710 costs $1,425 from the firm at 3849 Gaines St., 92110.

QM-1 Feature Eases Emulation

WILLIAMSVILLE, N.Y. – The Nanodata Corp. has introduced an enhancement device for its QM-1 microprogrammable computer designed to ease programming for emulation.

The Rotate, Mask and Index (RMI) device "presents main memory to the progammer in such a way that the task of formatting main memory becomes unnecessary when he's involved in emulation," Nanodata said.

The device costs $3,000 from the firm at 2457 Wehrie Drive, 14221.

On-Line Mill Information System Controls Materials, Cuts Errors

By W.T. Stephens
Special to Computerworld

WEST MONROE, La. – An on-line factory information system has brought Olinkraft's Mills Division two key advantages: better material accountability and a universal set of procedures that helps keep mistakes down.

The firm went to a "distributed processing" approach using an IBM System/7 dedicated to the on-line system. The small processor runs unattended and transmits batch data to an IBM 370/135. The company feels it gets 80% of the capability at 10% of the cost of a system using one larger business computer dedicated to the on-line work.

By this distributed processing approach, the 370/135 is free to store and process large amounts of data involving all 28 of the division's plants.

In this way, a total mill information system using these two computers has been constructed. The system covers activities such as order entry, billing, sales analysis and cost accounting.

The $4,800 monthly cost of the data collection and information system, including the smaller System/7 computer, nine data entry units, three printers and two display terminals, has been more than offset by direct manpower savings.

Seven employees who were involved in weighing rolls and preparing shipping documents in the mill have been reassigned, mostly to other jobs which enhance shipping efficiency and customer service. The system also is responsible for additional labor savings in the accounting and billing departments.

The most significant advantages derived from the system relate to the availability of production information:

Accountability: The ability to account for production, inventory, shipments and sales has been substantially improved and losses have been reduced by more than 90%.

Status information: The status of every production run, order and shipment is available immediately. This enables the division to produce more efficiently, keep each order moving and keep the customer happy, particularly by making sure his order isn't underrun or overrun.

The system gets the information into the hands of the line supervisor who needs it most. These are the men who make the operating decisions, often based on limited data, which affect the profitability of the company.

Throughput: Despite its low cost, the system produces information almost entirely automatically, largely eliminating the delays and errors that are inherent in manual entry.

The System/7 can store data covering as many as 30,000 rolls and 10,000 open orders. It has two disk drives for technical backup and automatic programming load and restart in the event of a brief power failure.

In the Mills approach, the data entry devices linked to the System/7 are located at key operating points in the plant.

At the rewinder for each paper machine, the computer automatically gathers footage information from a digital readout beside the entry unit and adds the data to its stored roll and customer records.

The operator merely inserts a "set card" in the data entry unit to trigger the system. He then staples a roll card to the core, routes the roll to the scale and sends a tear sheet to quality control.

In the quality control section, personnel enter moisture and basis weight data or, if they find a flaw, enter data indicating that the roll is being held. The system won't allocate any production before the data is received from the quality control lab.

The system automatically records the scale weight, calculates what the roll should weigh based on footage and basis weight and compares the two. If there is a discrepancy, the computer notifies the operator via an adjacent printer.

The only printed documents produced by the system now are the error messages at the scale and shipping tallies.

Each morning, the System/7 transmits to the 370/135 in a batch mode all the transactions that have occurred over the past 24 hours. The 370 updates its master files on production performance, order backlog, inventory roll status, shipping and billing. It produces detailed production performance data, by machine and grade, for a 9 a.m. operations meeting in the mill.

The 370 also produces daily reports on order status and backlogs, inventory by customer, shipping for the day, month-to-date and year-to-date, by customer and product. It generates daily billing and month-to-date billing and profitability by account and product.

IBM 2797 data communications units are located at the rewinders for each of the six paper machines to transmit information directly to the System/7.

This, then, is the "80% capability" of the projections mentioned earlier. The 20% not yet achieved is due to the limited amount of data storage available in the System/7.

To other mills considering installation of a production information system, it is suggested:

- Give the best man available the responsibility for the job.
- User participation is absolutely vital.
- Train everyone thoroughly.

W.T. Stephens is director of financial planning, Olinkraft, Inc.

Materials Requirements Planning: 'Scheduled' Control

By Oliver W. Wight
Special to Computerworld

Materials requirements planning (MRP) is a popular topic among manufacturing firms these days, since many companies have used the technique to reduce inventory by as much as a third and to substantially improve productivity.

MRP is basically a new approach, despite claims from some users that they have been doing this sort of planning for a long time.

Most of these users have actually been doing some kind of bill of material explosion to calculate inventory requirements.

The real breakthrough in material requirements planning came the day we realized that an inventory control system could be a scheduling system. Once we broke the traditional habit of using an inventory control system to launch orders and an informal expediting system to pull through the material needed to cover actual physical shortages, production and inventory management came out of the dark ages.

Order launching and expediting was disastrous. Yet it was the only way we could do things before the computer became available.

Picture a typical company with 20,000 to 40,000 components that they have to manufacture or purchase. Even if someone could make up a proper schedule for these components when they were first being ordered, it would be impossible to keep the schedules valid manually.

The informal expediting system finds out about the components that are really needed when material is pulled from a storeroom to supply an assembly line. Unfortunately, these shortages are discovered too late. In the meantime, many other items are "late" in the shop or with vendors, but are not really needed.

Machine load reports that are intended to help the foreman typically only show him a huge overdue load in the past due period. This results from shop orders that were originally released with due dates on them which have long since past. Much of this material should have been rescheduled.

Unfortunately most companies have all they can do to expedite without doing the job they should be doing of "unexpediting." Since orders that should have been rescheduled in many cases are the basis for generation load reports, the load information is transparently absurd.

Purchase commitment reports that report the cost and age of all open purchase orders will show the same kind of silly picture. Many dollars worth of material would appear due to come in the current and past due periods. Sometimes the indicated totals will be two or three times as much as will actually come in during any given month.

People Support

MRP can keep schedules valid *if* people will manage it properly. This is the clue to successful installation of MRP. We've got to recognize that it is a system that will support people, not supplant them.

MRP will tell a planner what to order and when to order it and when the computer feels that a reschedule is required. In manufacturing, however, we can't simply follow directions. We're working with very limited resources and trying to get the best possible result. As a consequence, human judgment must be used and used very well.

So the first thing that has to be done is to design the system around people. This must be done logically and as simple and understandable and quite standard.

If one looked at the MRP systems installed at a variety of major firms today, one would find they all look virtually identical. Employee education can support a system using standard logic, so it's a mistake to come up with a reinvention of the wheel.

By the same token, it's a mistake to expect users to know what they want. Most users have never had experience with a formal scheduling system that really worked. They wouldn't know how to ask for one so they must be educated long before they can be expected to participate intelligently in the development of this type of system.

There are three other major concerns that people ought to step up to when installing this kind of system.

First, they need to have good inventory records. Very few manufacturing companies have accurate inventory records and order launching and expediting systems do not require them.

But once we start using the inventory records in the computer to predict what the shortages are and to schedule to prevent them, the records must be accurate.

Second, bills of material need to be accurate. Since in the past they were reference documents rather than operational documents, this wasn't always true. Bills of material also must represent the way the product is made, not just the way the engineer would like to think of it. As a consequence, bills of material sometimes need to be restructured.

Third, the master bill schedule must be accurate. Whenever the chips are down, whenever a department is overloaded, whenever a vendor is having trouble delivering, whenever a purchasing department has too many expedite reports, somebody is bound to ask the significant question, "What do you *really* need?"

An MRP system is successful if it answers that question, but if the master schedule is overstated – and almost every company has in it some veterans of the informal system who always want to have the system show that more material is needed than they really need – MRP will not answer the question correctly. Perhaps the most difficult problem of all with MRP is getting people to manage the master schedule properly so that MRP can generate and maintain a valid schedule.

An accounts payable system works if a check is written and sent out in the mail. The banking system works if the customer statements balance correctly and are sent to them. An MRP system just generates paper and puts it in front of people who must get in touch with the vendor, decide whether a reschedule is really critical or decide which reschedule is the most important one when capacity is short or material isn't available to meet all requirements.

As a consequence, this kind of system revolves around people. If the people understand what MRP really is, if they see it as a way to predict shortages ahead of time and to give them a chance to prevent more of them, it's bound to make sense to them. If it does – and the bills of material and inventory records and master schedule are handled properly – MRP will work and will generate dramatic results.

Wight is president of Oliver Wight, Inc.

Two PDP-15 Configurations Priced Below Older Models

MARLBORO, Mass. – A new series of PDP-15 hardware configurations from Digital Equipment Corp. (DEC) is priced 6% to 11% below previously available configurations.

Applications for the new computer configurations range from batch processing to production automation, real-time resource sharing, computer-aided design, research and data base management. Typical users will include schools, laboratories and industry, DEC said.

The PDP-15/78-A, a single-cabinet configuration, is the smallest member of the PDP-15 family. It can be used as a building block for a larger computer system, or it can be used in its standard configuration to develop special-purpose software. Its standard configuration consists of a central processor with 24K words of memory, high-speed paper-tape reader and punch, an extended arithmetic element (EAE), real-time clock and the new LA36 Decwriter II keyboard printer as a console device, DEC added.

A dual-cabinet version of the PDP-15/78 includes DEC's magnetic tape control and transport (Dectape) as well as the components of the PDP-15/78-A.

Priced at $44,000, the dual-cabinet configuration has the hardware required to run a software "package" known as the PDP-15 Advanced Software System. This package is a monitor designed for research and engineering environments where data acquisition and control functions are combined with interactive program development and testing, DEC said.

Both PDP-15/78 configurations can accommodate 24K words of additional memory. With extra cabinets, memory can be expanded to a maximum of 128K words.

Dual Processors

The dual-processor PDP-15/76-C systems are designed for use with the RSX Plus III (a resource-sharing operating system) or DOS/Batch (a disk-based operating system for batch processing). They incorporate the following in three-cabinet configurations: either Dectape or on industry-compatible magnetic tape, a central processor, high-speed paper tape and punch, EAE real-time clock, an LA36 Decwriter II, a peripheral processor, 1.28M words of cartridge disk storage, 32K words of memory storage in the CPU and 8K words of memory storage in the peripheral processor.

A system with Dectape as the storage medium is priced at $68,500; a system with industry-compatible tape costs $75,000.

The PDP-15 memory management/automatic priority interrupt package and 16K words of memory can also be incorporated into the PDP-15/76-C three-cabinet configuration. Memory can be expanded to a total of 128K words for these configurations by using extra cabinets. The minis will be available in March.

Price reductions were also announced ranging from 19% to 30% on main memory units for PDP-15s. The prices, which were effective Oct. 1, include reduction of the 8K-word memory price from $8,000 to $6,000; reduction of the 16K word memory price is from $14,000 to $9,800.

In addition to memory, the price of the floating-point hardware for the PDP-15 was reduced from $12,000 to $9,750.

Advanced Digital Systems Octal Display

Display for Nova 2/4, D116 Minis Converts Binary Data to Octal Code

MOHAWK, N.Y. – "A programmer's delight" is the way Advanced Digital Systems, Inc. describes its octal display attachment for Data General Nova 2/4 and 1200 and Digital Computer Controls D-116 minicomputers.

Miniworld

The device converts both the memory address and the data from binary to octal and displays it on a LED display.

A programmer can have direct compatibility between the minicomputer readout and the assembly listing, the company said. The display saves debugging time because it virtually guarantees accuracy of original entries through an immediate visual check, the company stated.

The display adheres to the mini's front panel with double-back tape. An interconnect logic box plugs directly into the mini's logic panel.

The octal display costs $399 from the firm at 146 W. Main St., P.O. Drawer D, 13407.

T-Comm, Disk, Tape Provide CPU Backup

BOHEMIA, N.Y. – The Periphonics Corp. T-Comm 7 data communications processor is designed to provide backup if a user's mainframe should go down and, in addition, give fraud protection during nonbusiness hours.

Designed for use by banks and credit organizations, the system consists of the T-Comm 7 processor, disk drive and tape drive.

To set the system in operation, all negative status account numbers and the reasons for their negative status, such as lost or stolen credit cards or overdrawn accounts, are loaded onto the disk file.

Disk Updated

From this point on, through a link with the mainframe, the disk file is kept current as accounts are added or deleted from the negative status file.

Should the mainframe go down or be taken off-line for any reason, all incoming messages are routed to the T-Comm 7 disk system. As each message is received, the account number is compared with the numbers in the negative status file. If the number is found in the file, any of a number of responses can be generated depending on the coded reason for the number being present in the file.

If the amount of the transaction exceeds a preset limit, for example, the caller may be referred to a credit supervisor for approval.

If the incoming account number is not matched in the negative status file, the transaction is approved within the use frequency and dollar amount limits set by the user.

The disk also serves as a transaction file, recording every inquiry and response to insure that transactions on any account are held within the preset frequency and dollar limits.

The transactions are simultaneously recorded on magnetic tape as backup.

Updating and access are handled by a file management program which uses a "hasing" technique in writing to the disk. The program writes account numbers on the disk in a manner rather than numerical sequence for a lower average access time and increased throughput, the company said.

The basic system, including the T-Comm 7 system, a 9-track 800 bit/in. magnetic tape drive with controller, a 2.5M-byte disk drive and controller, a communications link and software leases for approximately $3,600 per month, plus maintenance, on a three-year lease.

The company is at 75 Orville Drive, 11716.

Interface Card, Tape Give Nova, PDP-11 23M Bytes of Mass Storage

PLAINVIEW, N.Y. – Qantex's interface card and tape storage system is said to provide a Digital Equipment Corp. PDP-11 or Data General Nova minicomputer with up to 23M bytes of mass storage.

The interface card for the Qantex Series 2400 tape storage system plugs directly into a peripheral controller slot in the PDP-11. Software control requires manipulation of one status/control register and a single data buffer register on the interface card, the firm said.

The two-drive 2400 tape storage system is fully compatible with DEC's cassette software, a spokesman added.

A one-drive system costs $2,650, including interface card, while the full eight-drive system costs $9,490 from the firm at 200 Terminal Drive, 11803.

Plessey Switch, Management Card Expand Memories of PDP-11, Nova

SANTA ANA, Calif. – Plessey Memories has a new memory switch, similar to but less expensive than the Data General Memory Allocation option, and a new memory management card that is a less expensive replacement for the Digital Equipment Corp. (DEC) KT11-D memory management option, according to the company.

The memory switch, the PM-8/12MX, allows the use of up to 256K words of memory with Nova 800, 1200 or equivalent minis.

It plugs directly into a Nova memory or I/O slot and is transparent to Data General operating software, the company said.

Plessey said it may also be used with the firm's PM-816, PM-1200 and PM-1216 card memories, or Data General 8117, 8121 and 8269 memories.

The memory management card, the PM-11D, permits expansion of DEC PDP-11/35 and 11/40 processor memories beyond their standard 28K-word limit. It provides complete memory management and protection for up to 128K words of storage, the firm said.

Kernel and User mode operation and stack limiting are standard features of the memory management card, and Plessey said it may be used with the Plessey PM-1105, and PM-1116 card memories, and DEC MM11L, MM11S and MM11U memories.

The memory switch sells for $2,835. The memory management card is priced at $2,000 from Plessey, 1674 McGaw Ave., 92705.

Confax Turnkey System Aids Trucking Firms

SPRING VALLEY, N.Y. – A turnkey system from Confax, Inc., provides an information processing service for both small and large trucking companies.

Confax-Mod allows smaller firms to access programs over leased phone lines for message switching, freight bill processing, overhead billing, central rating, tracing and equipment control.

The package includes the online processing, software, terminals, communication lines and training, Confax said.

For larger user wants the system in-house, Confax will install it on a turnkey basis.

Basic Confax-Mod service costs $4,000/mo., while a complete turnkey system sells for up to $500,000, plus the cost of the mainframe, the firm said.

Confax is located at 501 S. Main St., 10977.

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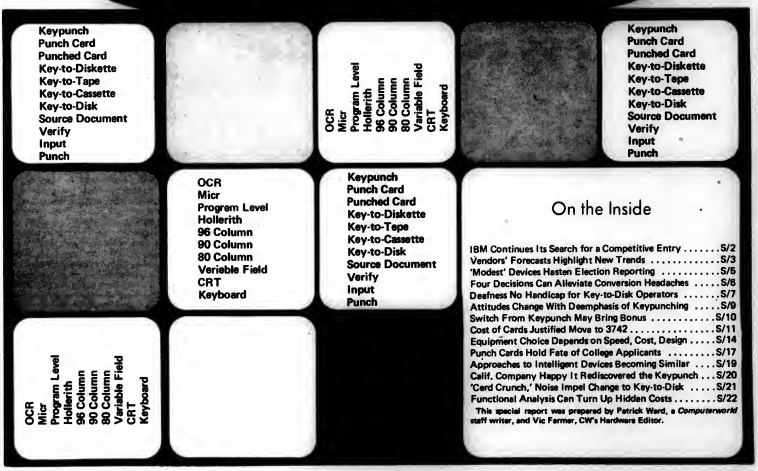

data entry

Keypunch
Punch Card
Punched Card
Key-to-Diskette
Key-to-Tape
Key-to-Cassette
Key-to-Disk
Source Document
Verify
Input
Punch

OCR
Micr
Program Level
Hollerith
96 Column
90 Column
80 Column
Variable Field
CRT
Keyboard

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This special report was prepared by Patrick Ward, a *Computerworld* staff writer, and Vic Farmer, CW's Hardware Editor.

OCR
Micr
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Keyboard

History of Hesitancy

IBM Continues Search for Its Own Competitive 'Entry'

By Vic Farmer
Of the CW Staff

Just five years ago IBM was struggling with what would turn out to be a major problem – what it should do to tackle the growing challenge of data entry.

Faced on one side by internal evaluations that the 029/059 keypunches and verifiers were "deficient" when compared with Univac's 1701/1710s, IBM's management committee toyed with releasing 96-column card equipment for the 360 Series. At least the 5496 was "equal" to the 1701/1710 combination, according to a 1969 IBM DP Commercial Analysis presented during the Telex/IBM suit last year.

But on the other hand, the IBM 50 Magnetic Data Inscriber, relatively elementary and straightforward unbuffered key-to-tape cartridge system that depended on punch cards for format control, was receiving poor market acceptance. It, too, was internally evaluated as "deficient" when compared with Mohawk Data Sciences' key-to-tape units and Vistron's key-to-cassette announcements.

Indeed, IBM was fooled by Vistron too.

Specifically reviewing the Vistron System 21, an IBM report warned the management committee that "due to the low cost of this system its impact on the data entry market could be very significant."

The 21 consisted of a CRT, Selectric-type printer, two tape cartridge drives and a microprocessor. It was originally touted for rent at $39/mo.

But IBM was not sleeping. The company had Poke in the wings, which the reports

Analysis

revealed as a key-to-disk system that could adequately compete with the Logic Corp. LC-720 Keydisc system with up to 72 keystations.

Vistron's CRT keystations, however, were about one third the cost of a Poke station and, as such, may have contributed to keeping IBM out of the key-to-disk area at that time. Even later, in the early part of 1970, IBM classified Vistron as the "most significant threat to IBM's data entry market."

Besides Poke, IBM also planned a smaller "key-to- . . . " system called Viking, which in configurations of eight, 12 and 16 stations would have had a price advantage "except when compared with Inforex and Vistron." The Viking I was rated by IBM as superior to all then available key-to-disk systems except for Vistron and Sycor.

And the Viking was rated superior to the cluster systems in small installations (up to eight stations) except for Inforex where it was equal in function "but price deficient."

In the large installation, according to the IBM reports, Viking I would probably not compete with the cluster key-to-disk systems "since 2260s, a Viking II cluster system (if announced) or a combination of IBM data entry equipment would probably be more suited to the customer's needs."

IBM summarized where it stood on the Viking I in the third quarter of 1970 with this terse statement:

"A serious problem affecting the ultimate acceptance of Viking I is its relatively late announcement date (3Q71). It's entry into the marketplace would be too late to take full advantage of any functional characteristic which today make it superior or equal to existing competitive data entry products."

By 1971 the reports indicate the Viking was no longer in the same competitive position it had been the year before.

And by August 1971, just before the proposed announcement date, IBM found "as a keypunch replacement, the Viking prices were not competitive with three leading companies – Inforex, Computer Machinery Corp. and the Univac 1700 Series. The result was reevaluations and redesign . . . and no product announcement.

Two years later, in December 1973, the Viking surfaced as the 3741 data entry station, redesigned to incorporate a diskette instead of a tape cassette.

There are questions as to why IBM consistently held back from announcing sophisticated data entry equipment and one of the answers most cited is that the rental base on installed keypunches represented just too much profit to toss aside.

But in a 1970 management committee meeting, Thomas J. Watson Jr. stated that the problem of erosion in the data entry area had been around for two to four years "and that we still had no solution." He wanted to know "why this was so."

The answer he received was quite simple – data entry product planning had been given to the wrong department of the wrong division. Buck Rogers then consoled Watson by saying "a coordinated effort now existed across the two problem divisions . . . and in this growing market we're not doing well at present but the new plan would allow us to hold our own in the future."

After a very slow start that saw IBM outdistanced in the growing key-to-disk area, the firm has increased the pace.

The 129 buffered keypunch is well accepted. The 3741 data entry stations are continually being enhanced, and large online data entry systems in banking, finance and business will soon be installed.

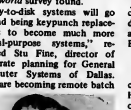
For all appearances, IBM now has a game plan. And the rumored announcement of the System/2 minicomputer early next year may make it just that much easier for IBM to finally break into the key-to-disk area with a competitive product.

Forecasts by Vendors Highlight New Trends

By Patrick Ward
Of the CW Staff

NEWTONVILLE, Mass. — Distributed processing, dispersed data bases and interactive data entry are the trends vendors see in store for data entry over the next three to five years, a *Computerworld* survey found.

"Key-to-disk systems will go beyond being keypunch replacements to become much more general-purpose systems," remarked Stu Fine, director of corporate planning for General Computer Systems of Dallas. They are becoming remote batch



Frank B. Holst: "There will be such a variety of equipment available that systems designers will have to accept data entry as part of their total systems design."

terminals and data collection centers for a variety of data entry devices as well.

In fact, "the key-to-disk suppliers and the suppliers of remote batch terminals are going to pass each other going in opposite directions over the next few years," predicted Patrick Shannon, director of North American marketing for Canada's Consolidated Computer Ltd., a Toronto-based key-to-disk manufacturer.

"It's a question of cost," Fine said. Many of the limitations on what key-to-disk systems can do has been imposed by the speed and memory size of their processors, he explained. The cost of those elements is shrinking in relation to the rest of the system.

This means that in the next three to five years users are likely to obtain much more throughput and much more capability for concurrent applications such as key entry, data transmission/receipt and offline printing performed simultaneously on their key-to-disk systems.

The continuing trend in using this kind of equipment will be to take data entry away from the large data entry shop where the operator is not directly familiar with the application, observed William B. Slaughter, director of marketing for Mohawk Data Sciences, Herkimer, N.Y.

Data entry as a by-product of other clerical operations would be a chief advantage of this move, noted Frank B. Holst, director of program management for Univac in Bluebell, Pa.

(J.L. Poitevent, vice-president of Recognition Equipment, Inc. of Dallas, expressed a similar idea: Generally, he said, business sees "data entry as [its] most labor intensive cost and the least controllable [cost in] the inflationary economic spiral.

("We see a concerted effort by business to eliminate redundant data preparation steps by shifting from the classic centralized keypunch shop to more efficient systems.

("Regardless of whether you call these new systems 'source data automation' or 'distributive accounting,' the trend is there," Poitevent noted.)

CRT-Prepared Forms

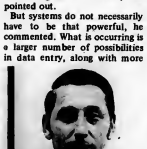
A clerk processing an order at a company's remote sales office, Holst said, might prepare the order form on a CRT, both producing a hard-copy document and entering data for the central DP installation at the same time.

This would bypass keypunching at the central site and other steps involving labor, errors and delays, he observed.

Such a distributed data entry site would have its own files on mass storage, and that would mean less keystrokes for an operator who could just call up a file and add variable information, Holst noted.

Machine intelligence would allow the user to do a great deal more in the way of checks and balances at the source, Holst said. Additionally, the person doing the data entry would be the same person who is most knowledgeable about creating the original document, he pointed out.

But systems do not necessarily have to be that powerful, he commented. What is occurring is a larger number of possibilities in data entry, along with more



J.L. Poitevent: "The long-range picture must include electronic image processing."

modularity to fit the individual application area.

"There will be such a variety of equipment available that systems designers will have to accept data entry as part of their total systems design," Holst predicted.

Handling 'Housekeeping'

Another benefit with intelligent data entry systems, several vendors noted, is the chance to handle routine data entry "housekeeping" tasks outside the main processor itself.

"We have tried to look at functions performed on the mainframe and see if we can do them on our systems," mentioned J. Robert Taylor, vice-president of domestic operations for Inforex,

(Continued on Page S/4)

Prices Holding Steady

The prices of data entry equipment will hold relatively stable in the next year, according to a recent *Computerworld* survey, but vendors suggested that maintenance charges are likely to rise.

Most vendors also predicted delivery of their products within 30-90 days. IBM, however, reported four-month delivery for its 129 buffered keypunch and a similar time for delivery of Models 1 and 2 of its 3741 key-to-diskette unit.

Delivery of Models 3 and 4 is about nine months, a spokeswoman said.

Deliveries of Univac's 1900 key-to-disk system are in seven to eight months, according to Frank B. Holst, director of program management for the firm and William B. Slaughter, director of marketing for Mohawk Data Sciences, said lead times for delivery of that firm's key-to-disk gear is four to six months.

Typical delivery times for Recognition Equipment, Inc. devices range from six months to a year, depending on the complexity of the system and the customer's schedule, said J.L. Poitevent, vice-president of the firm.

Tab Products Co. can deliver its buffered keypunches in 45-60 days or less, said company president Harry Le Claire. In spite of the growing number of other data entry alternatives, Le Claire said the keypunch retains an important role.

"It's going to end up as an application game," Le Claire predicted. "There are certain applications that are better on key-to-disk, and there are others that are better on punch card."

Le Claire noted the price of his equipment will probably rise next year because of inflation, but he didn't say by how much.

Inforex's 1301 and 1302 models may rise in price by 8% to 9% in the next 12 months, predicted J. Robert Taylor, vice-president of domestic operations. The company fills half of the orders for those models within 30-45 days, he said.

Cliff Levanthal, product marketing manager for Potter Instruments, said his company's System 85 key-to-diskette system should "remain relatively stable over the next 12 months, and maintenance costs are also unlikely to rise." Deliveries are in 60 days, he said.

Incoterm's current hardware is delivered in 60-90 days, according to Brent Barkley, director of marketing support. There are no plans to raise hardware prices, but maintenance costs may go up, he added.

Data 100 doesn't plan to increase prices for its key/batch system in the forseable future, noted Lee Stevens, director of product marketing.

Consolidated Computer Ltd.'s key-to-disk products are delivered to North American customers within about 90 days, noted Patrick Shannon, director of North American marketing for the firm.

Recognition Equipment prices during the next 12 months and the next three to five years "will depend upon the level of inflation, and it is probable that any selling price of currently announced products will eventually reflect the general economic trend," Poitenent said.

Move to Distributed Processing Predicted

(Continued from Page S/3)

based in Burlington, Mass.

Consolidated Computer's Patrick Shannon joined other vendors in predicting that key-to-disk will become the real focal point of data entry over the next decade.

"You will see intelligent terminals hung on a key-to-disk system, perhaps an OCR reader," he said. All data would come into this one system to be verified and corrected, and then released to the processor.

"Over the next three to five years, we would expect to see greater use of mixed media systems," predicted Recognition Equipment's Poitevent. "The combination of OCR and key entry seems to be a natural evolution. Since a substantial portion of all data is hand-written, increased use of OCR to read this media can be expected."

Operators doing order entry, accounts payable and accounts receivable applications on a key-to-disk system could retrieve a file in the system's own mass storage, noted William B. Slaughter of Mohawk. When the

Patrick Shannon: "Key-to-disk suppliers and the suppliers of remote batch terminals are going to pass each other going in opposite directions."

operator wanted a file that was not in the dispersed data base, the key-to-disk processor would route that inquiry to the central site.

There are other, less expensive ways of handling such inquiries, but this approach is a possibility, Slaughter said.

With the trend toward data communications, it was logical for Minneapolis-based Data 100, a remote job entry (RJE) terminal maker, to "start supplying the data entry user who is showing interest in the area," noted Lee Stevens, director of product marketing for the firm.

While Stevens said Data 100 does not see itself building a large stand-alone key-to-disk product, he said the company hopes to offer more powerful remote batch systems with more keystations having larger screens and with an expanded amount of disk storage so key entry operators can work interactively with files.

Brent Barkley, director of marketing support for Incoterm of Natick, Mass., sees his firm continuing to supply clusters of up to eight keystations.

Cliff Leventhal, product marketing manager for Potter Instruments, Plainview, N.Y., whose System 85 is said to be an IBM 3741-equivalent, said he anticipates a number of data entry systems will evolve into local small business systems in the next few years.

He noted that Potter is offering RPG on its System 85 and "we already see [it] . . . as replacing System 3s for payroll or other small business applications."

What will the next 10 years bring in data entry systems?

They will be evolutionary, Leventhal said. Storage capacities will be much greater and printing speeds will be much higher for the same price.

Radical technical change would provide an undesirable discontinuity, he said.

"The long-range picture must include electronic image processing," said Poitevent.

"The economic implications are overwhelming, and it is reasonable to assume that the ability to electronically capture images, recognize selected areas using OCR techniques and pass images from one point to another will be economically and technically feasible within 10 years."

"Evolution seems to be the way," said Data 100's Stevens in response to the same questions, "but the evolution itself is fairly revolutionary."

Stu Fine: "Key-to-disk systems will . . . become much more general-purpose systems."

Maryland County's First Try

'Modest' Devices Hasten Reporting of Election Returns

By William T. Ziegler
Special to Computerworld

Anne Arundel County's first venture into computerized voting showed that relatively modest data entry equipment can speed reporting of returns and cut numerous man-hours from postelection recordkeeping.

About two weeks before the Sept. 10 Maryland state primary election, someone upstairs came up with the idea that we should have computerized election returns, "like everyone else does."

Officials were interested, and our systems and DP manager felt we could probably make it work with our Four Phase Systems, Inc.'s Model 7008 key-to-disk system.

The actual operation was pretty simple and went very smoothly. While reporters and other interested onlookers took seats in the corridors outside the computer room, eight people from the election supervisor's office took telephone calls from the precinct polling places, which relayed totals from the voting machines.

Tally sheets were passed to the data entry supervisor, and four data entry operators keyed the data to disk and verified it.

The polls closed at 8 p.m. and the calls started coming in around 8:30. We quickly found that five was the proper number of precinct tallies for the data entry supervisor to dump to tape for use in computer updating of candidates' cumulative totals.

Each computer run consisted of a single sheet listing the names of the 206 candidates for office with the votes received in each precinct contained in that update, followed by a single sheet showing cumulative totals. Using five-ply paper and with the computer programmed to print the results of each run five times, each run produced 25 copies of the update.

Quickly decollated, the copies were passed to eager reporters and a few anxious candidates in the corridor.

"The process took only 21 manhours of effort. Keypunching the same data would probably have taken 60 . . ."

Shortly before 11 p.m., the calls stopped coming. Seventy-six of 82 precincts had reported and 19 computerized updates of returns had been passed to the public in less than 150 minutes.

The final unofficial report was run at 11:36; official results a week later showed no differences, not counting absentee ballots.

After the voting, there remained the task of posting the individual voters' records on whether they voted and producing statistical reports.

Ann Arundel's method was to scan the bottom of each voter's voter authority card, where the voter's file identification number is printed. As each voter arrives at the polling place and identifies himself, he is handed his card to sign and deliver to the voting machine operator.

When the polls closed, the cards of registrants actually voting were batched and delivered to the DP department where they were put through a Computing Entry Systems Model 8500 OCR reader. Although the reader is relatively slow, it is inexpensive (less than $1,000/mo rental) and accurate.

Originally procured for use in processing water and tax bill receipts, Anne Arundel has found a multitude of uses in all forms of turnaround documents, of which the voter authority card is the latest.

With the light election turnout experienced, only about 40,000 cards had to be read at a speed of about 2,000 per hour. Taking priority after daily water and tax receipting, the file identification numbers of all voters were OCR-read to magnetic tape and computerized records were posted one week after the Tuesday election. Also delivered to the supervisor of elections were all the statistical summary reports.

The process took only 21 manhours of effort. Keypunching the same data would probably have taken 60, so it looks like Ann Arundel County will stick with its new system.

Ziegler is DP operations manager for Anne Arundel County.

Four Decisions Can Alleviate Headaches of Conversion

By Barbara Wiggins
Special to Computerworld

Although much has been said and written about the benefits of converting from keypunch operations to key-to-disk, the new user is often unaware of the problems and headaches which can occur in the changeover.

Conversion requires decisions affecting four main areas: equipment, personnel and personnel training, workload and operational and control procedures.

The first problem area, equipment, is possibly the easiest to solve. Obviously, since there is a shift from a card-oriented environment to a key-to-disk system, some of the old equipment can be discarded immediately – but not all of it should go until the other three problem areas are attacked and resolved.

Before any of the keypunch gear can be eliminated, retraining of personnel on the new data entry equipment must be set in motion. Retraining can take place either on the supervisor level, by shifts or by jobs (applications).

If labor union regulations are in effect, the decision as to whom to train and when will probably not be totally in management hands.

If not, it will be up to the DP manager to decide whether the supplier trains only supervisors, an entire shift of keypunch operators or a combination of these people at once. Unfortunately, the training provided by the new system supplier cannot be on a one-by-one basis.

Determine Order of Jobs

While working with the supplier on the training schedule, the manager must look into the next problem area, the workload, and determine which jobs will be the first ones on the new system.

If the DP manager and his staff have confidence in the new data entry system and are well informed of its capabilities and operational and programming procedures, then conversion can begin with any high-volume applications. Likewise, the old equipment can be rapidly phased out and the majority of keypunch personnel retrained at the very beginning.

If the DP manager is somewhat uncomfortable and apprehensive at taking such a step, however, he can begin the conversion process with relatively low priority jobs. If a certain group or shift of operators are dedicated to those tasks, training on the data entry terminals can begin with them.

This approach will yield the following:

- "People response" to the new methods can be determined and subsequent training/orientation programs adjusted accordingly.
- The workload schedules for high-priority jobs will not suffer during the initial conversion process.
- Confidence in the new data entry system can be gained.

If the approach is to begin with the low priority jobs, the reprogramming should be kept at a minimum; that is, these jobs should remain in an 80-column format (if desired).

The new system should perform its checks and other editing/validating procedures, but the mainframe should also continue to check the data as if it came from cards.

If the mainframe catches errors that should have been detected by the data entry system, then a discussion with the supplier is in order. If not, and all goes well, then the higher priority jobs can be converted and put into the flow.

Once management has confidence in the new data entry system, then it can seriously begin discarding the keypunch gear, training the remainder of the people, converting other jobs, and scheduling new ones.

Sounds easy? Not quite.

Have the new functions and responsibilities of the keypunch shop been considered? It's no longer a place where coded forms are dropped off and the data is punched onto cards which are carried to the computer center.

Instead of being a keypunch shop, it's now a data preparation center.

Because the functions and responsibilities are changed, all of the related control procedures for the keypunch shop, DP center and other areas must also change. A good amount of discussion and agreement about the operational flow must take place.

About personnel: the manager has more people to consider than just the keypunch supervisors and operators. It's vital that the mainframe programmers and anyone else involved with the data handling be in on the new system operation from the very beginning.

Not only do these people need to be fully aware of the new system capabilities, but they also need to be behind the system and endorse the changeover.

The learning curve is going to occur on many levels. Negative attitudes will lengthen the learning curve, continue existing inefficiencies and temporarily defeat the purpose of the decision to improve conditions. Even under the best of circumstances, a production dip will be felt during the first two weeks.

Additionally, the supervisors and mainframe programmers should be encouraged to work together on input record layouts. Because the data entry system is capable of reformatting keyed data and performing checks, balancing, editing, etc., the programmer will be able to shortcut his programming efforts while also giving the operators a faster and easier way to key input data.

Recommend to the programmers that they keep the new systems capabilities in mind when programming new applications for the mainframe. Don't rush a programmer into converting a complex program unless it is sufficiently documented. (Otherwise, it can be accidentally destroyed when altered.)

Some programs and applications are best left alone for the time being and revamped after everyone is familiar with the new data entry capabilities.

The supervisors should also work closely with the existing DP personnel to set up the most convenient and efficient opera-

(Continued on Page S/7)

Totally deaf Inforex system supervisor instructs totally deaf class of data entry operators.

Deafness Is No Handicap For Key-to-Disk Operators

PASCAGOULA, Miss. – Eighteen of the 74 data entry operators at Ingalls Shipbuilding here are totally deaf.

The deaf workers are "very appreciative of their jobs, their absenteeism is less and they're less distracted," according to Joseph B. Garrard, supervisor of data entry.

The installation's first deaf employee was outstanding, explained Larry Williams, data preparation and remote supervisor for the firm. This employee brought in some friends who were also deaf to work in the data entry shop, Garrard continued, but the real increase came after Garrard decided to form a special introductory data entry class for deaf people. He had conducted many such classes before for people with hearing.

The original employee spoke about the opportunity at a local club for the deaf, Garrard said, and "then came a flood" of applications.

Many of them previously held menial jobs, but "they had the mental alertness and manipulative skill to do better than that," he remarked.

Garrard wrote the curriculum and the first deaf employee plus a group leader on the second shift, who has limited hearing, prepared their own lectures and conducted the course, he said.

The two instructors made full use of sign language and encouraged lip reading, he said. Between the two of them they did an outstanding job," Garrard related.

The course ran for two hours each Saturday for 15 weeks, ending last May, he said. The Gulf Coast Junior College District paid the two instructors for their instructional time.

Of the 15 students who began the course, 12 completed it. One, Mary Alice Pearce, was named Miss Deaf America.

The fact that the data entry shop had recently converted from keypunch machines to Inforex System 1302 key-to-disk equipment eased the training process, Garrard noted, since the deaf trainees could learn visually through their keystation CRTs.

When he lectured, or when Inforex representatives came to explain the insides of their machines, the deaf instructors acted as intermediaries between the speakers and the class, Garrard said.

The deaf employees work smoothly with their fellow employees, he mentioned, noting that several operators who are not deaf have learned sign language.

The Ingalls installation will launch another class if there is enough interest to form a group of about 15 people, Garrard concluded.

4 Decisions Alleviate Conversion Headaches

(Continued from Page S/6)

tional flow through the two areas. Not only can a duplication or conflict of effort be avoided, but the supervisor will need to know the requirements for tapes (i.e., density, header/trailer labels, tape marks, etc.) to be processed by the central computer.

These are but a few of the problems which can crop up during the conversion process. Chances are the DP manager will be tempted to say "life was easier under the old way," but he won't because of rewards such as faster document throughput, significant increases in operator productivity, major reductions in errors reaching the mainframe and reductions in overall operating costs.

Wiggins is a manager with General Computer Systems, Inc.

Using Plastic Overlays Eases Direct Keypunch Of Complex Documents

PROVIDENCE, R.I. – A health care research organization here has found the use of inexpensive plastic overlays allows its keypunch operators to work directly from complex hospital documents and makes an intermediate coding stage unnecessary.

Rhode Island Health Services Research, Inc. (Search) is a nonprofit organization that makes use of monthly batches of hospital admissions and discharge records in its studies, as well as other forms and questionnaires. The Commercial Computer Center in East Providence does all the keypunching and the punched cards are then processed on a computer at the University of Rhode Island.

Use of the overlays has not only allowed Search to eliminate the additional costs of coding, but also the possibility of errors coming in during that process, noted Eva Griffeth, Search's DP manager.

The first reaction to the templates at Commercial Computing Center was enthusiastic, she said.

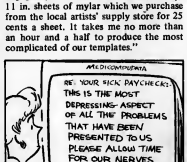
The keypunch operators work with the overlays when starting with a new type of document. Some of the operators continue to use the overlays after that, while others prefer to jot down notes for themselves from the overlay and then work from the notes, Griffeth explained.

Griffeth also uses the keypunching templates with her programmers. Instead of producing a card layout for them, she substitutes a photocopy of a document with its appropriate overlays

The programmers prefer this approach because they can readily see "each variable involved, how it is collected; the range of it and its position relative to the rest of the record," she said.

Not producing a card layout eliminates both extra work and another source of errors, Griffeth noted.

The cost of producing the templates is negligible, she added. "We use 8-1/2 in. by 11 in. sheets of mylar which we purchase from the local artists' supply store for 25 cents a sheet. It takes me no more than an hour and a half to produce the most complicated of our templates."



Attitudes Changing With Deemphasis of Keypunching

By Lawrence Feidelman
Special to Computerworld

Every time the discussion of computer data entry comes up, most people think only of the keypunch and how to get their cards punched for less money.

Keypunching was something done by the keypunch operator who was locked in a room until the right amount of work was produced, and only the bravest dared to venture in. The placement and condition of the keypunch room was usually a step below the average office environment.

It is interesting to note how the new types of data entry equipment have not only challenged the DP manager's opinion of data entry, but the man/machine interface as well.

The new data entry technologies, however, have given the DP manager tools to process computer input data in the most cost-effective manner. The key-to-disk system prompted his thoughts on machine verification instead of manual verification, data validation, use of CRT displays, data reformatting, operator productivity monitoring and placement of stations at work areas throughout the building.

Concepts Developed

Keyboard-to-storage terminals and optical readers have helped build the concepts of remote data entry at the source, data transmission instead of paper mailing and remote inquiry. Also, we now indulge in analysis of how data is generated at the source and have realized that a good portion of data entry errors occur before data reaches the DP installation.

The stumbling block lies with the user and his ability to fully utilize his systems. This key fact puts limits on our complete future optimism.

User reactions can be divided into three camps:

- Those that see data entry as a keypunch replacement.
- Those that see data entry as a separate computer system.
- Those that see data entry as an efficient input/output section of the main computer.

The future trends are obvious if we consider the evaluation, future system needs and technology. We are converging to the belief that the main computer should not be concerned with the data entry function which much lower-cost minicomputers and microcomputers can accomplish more effectively.

The minicomputer and microcomputer controller is the common element in the midst of this variety of man/machine interfaces to gather source data. Software can handle data from various devices, perform the necessary checks and edits and output data in the desired format. The minicomputer or microcomputer is obviously performing the housekeeping work for the main computer.

Furthermore, the data entry system not only sends data to the computer but receives data and prints or displays it.

What we see evolving is more than a data entry system — it is an input/output system and probably one that will require a new name, such as data entry presentation (DEP) system.

In fact, today we have the formation of such systems under the name of key-to-disk. Certainly all key-to-disk systems can print and display data and most can communicate directly to a main computer (if it's an IBM/360 or 370), as well as consolidate and validate input data.

There also are mixed-media systems that combine keyboard data entry with optical readers and the pushbutton telephone.

The remote keyboard concept, while acceptable within the same location, can be costly in terms of communication lines. Hence, we can expect to see these remote stations have their own microprocessors. Such a design is not new; the major POS terminals use it to permit continuous operation.

In summary, the basic DEP system design will include the minicomputer as controller and various input devices, in many cases with their own microprocessors. The result will, of course, be faster processors, larger memory and disk storage.

Small computer users who can't afford these mixed-media systems will tend, for the while, to be satisfied with the small key-to-disk systems on the market.

The beauty of this trend is that we won't see the system obsolescence that occurred with the larger computers, but rather a pattern of upgrading system hardware and software by adding input components to make a modern system.

Feidelman is president of Management Information Corp., publishers of Data Entry Today.

Switch From Keypunch May Bring Unexpected Bonus

MADISON, Wis. – The Ray-O-Vac Division of ESB Corp. originally decided to use intelligent terminals for order entry to speed up cash flow and tighten inventory control, but the move may bring clerical cost savings as well, according to Paul D. Porter, manager of information systems.

Ray-O-Vac, with main offices here, has a product line of approximately 800 items consisting of dry cell batteries, flashlights and lanterns. Order processing and billing is complicated by the need to qualify customers for sales promotion discounts which change frequently and by a broad mix of customers – from small hearing aid dealers to large national hardware, drug and food chains.

Currently, 60% of the orders are still received at 11 sales/service centers around the country where they are manually edited and the order information entered on shipping order forms by typewriter.

After shipment, copies of the shipping forms are mailed to Madison, where a variety of manual coding and keypunch operations are performed before the data is input into the computer.

But delays can occur before invoices are rendered, inventories are adjusted and management reports are created. In addition, there are many chances for errors since the order and shipping data is copied and rewritten a number of times before the final computer processing occurs.

However, the company has installed 17 Mohawk Data Systems 2300 intelligent terminals which now handle the remaining 40% of incoming orders and will be used for them all once the rest of the division's accounting systems are interfaced to the new approach, Porter said.

Ray-O-Vac evaluated the NCR 399 and Burroughs TC 3500 but chose the Mohawk units primarily because of their lower price and the fact that the Mohawk units had a CRT while the others did not, Porter said.

The system represents about a $200,000 investment in hardware and systems and programming development, he added.

The information the terminal operators key in is the sole entry of that order data for both inventory and billing purposes, Porter said. The intelligent terminals also print out a hard copy of the order for the pickers in the sales/service center's warehouse, he explained.

The terminals relieve order editors of many of the tasks now required before a customer order is ready for typing, including the weight and dollar calculations used to determine whether an order qualifies for special discounts or allowances or whether the shipment may move with the freight prepaid.

The operator can call up product codes and customer billing and shipping names and addresses from the terminal's disk. With the previous system this information had to be typed on the shipping order.

The operator still makes decisions when entering data on the shipping order form at the terminal, but the program is designed to guide the operator through each step.

At one point the CRT displays the total weight, total dollars and total number of cartons of the order so the operator can decide whether or not the various freight and discount minimums have been attained.

"We'll be speeding up our data processing and reducing errors by capturing edited data while writing customer orders once in the field on intelligent terminals, then polling the unattended terminals at night over dial-up Wats lines with a Mohawk Data Sciences 2400 system," Porter said.

"By morning, we will have processed the data and sent back any error and exception reports. Since we'll be bringing fresh, precoded information into Madison, we'll be able to bill an order the evening after it is shipped."

Forms description programs for the terminals are compiled on Ray-O-Vac's IBM 360/30, which also prepares a tape containing product codes and descriptions and a name and address file for the customers served at each individual sales/service center.

The 2400 processor is not on-line to the 360, Porter explained, so the sales order tape, received in batch mode on a 9-channel tape drive, is physically transferred to the computer.

Six Programs

For the terminal operators, Ray-O-Vac has written six programs: two for error transmission and corrections and one each for initialization, order writing, shipment confirmation and daily recap.

There are also weekly programs for reformatting product and customer files.

"We're already looking forward to a future terminal application which will have a positive effect on customer service," Porter said.

"We deal with a lot of mass merchandisers with many stores throughout the country. Sometimes, one of these customers gives us an order calling for the shipment of the same item or items to all of their stores – as many as 300 or 400 individual shipments. With the right programming, the terminal should be able to prepare shipping order forms for these orders in a couple of hours."

Porter said it is too early to tell whether the terminals will cut clerical costs, but that appears likely. The terminals in use, he said, have already provided the faster and more accurate information flow the company was seeking.

Survey of IBM Users Finds

Cost of Cards Justified Move to 3742

By Patrick Ward
Of the CW Staff

IBM's 3742 dual key-to-diskette data entry stations are a cost-effective alternative to keypunches if the rising price of cards is taken into account, two 3742 users told *Computerworld* in a recent survey.

A third user agreed with the others that the 3742s were highly reliable, but he had harsh criticism for the 3747 data converter as a communications tool.

Colgate-Palmolive's New York City headquarters switched from eight IBM 029s and four Inforex keystations when the company set up a data center 50 miles away, according to Manfred Zerbe, staff analyst.

The choice of six dual 3742 stations and one 3741 was due to the "mere fact that the IBM sales manager sold the operations manager on the idea," Zerbe said.

He added the company did not make any study of key-to-disk systems or other equipment, in contrast with its usual policy.

The 3742s came in just as the company converted from DOS to OS, Zerbe said. Since DOS is not device-independent, the staff would have had to recompile every program that had card input, in order to take advantage of the diskettes, Zerbe remarked.

"We would never had gone to that [diskette] concept had we stayed in DOS," he commented.

An IBM 3747 stacks the diskette's data onto a tape, and the shop transmits that data to another 3747 at the consolidated computer center. And there lies the bottleneck, Zerbe said.

There have been no troubles with the 3742s or 41, but "we have had just about every problem imaginable with the 3747s," he claimed. "We've almost had a resident engineer here to pamper this thing."

One recent problem was that the 3747 at headquarters would not pick up a disconnect signal on the line and data would be lost. Colgate had hoped for 2,400 bit/sec transmission, but is sticking to 1,200 bit/sec to keep problems down.

Troubles with the dial-up telephone line have compounded things, but Zerbe said he is not optimistic that leased lines would bring much benefit.

The shop currently does about four hours of transmission a day of accounting, payroll, profit estimates and "everything else" except order entry.

Zerbe said Colgate-Palmolive has other sites being centralized nationwide, and for those "we'll take a more careful look at what is available."

On the Other Hand . . .

Jerry Jenkins, DP manager for the Macke Co., Cheverly, Md., is a more satisfied user. The company has a food-vending business extending into 26 states, and Jenkins said he plans to have 3741s in regional centers transmitting to the central site here before long.

Currently, headquarters uses six of the dual 3742 stations to do payroll, accounts payable, receivables, commissions and equipment depreciation figures. A 3747 data converter puts the diskette data onto tape.

Jenkins said cost justifying the 3742s was simple: on a two-year fixed-term lease, they cost less than 029 keypunches. And he pointed out that "you can buy a diskette for $6.25 and use it for five years while you're paying $2 a thousand for cards now."

A concern over lack of reliability was one reason he did not choose s key-to-disk system for the application, Jenkins said.

The 3742s replace six IBM 029s and four 059 verifiers plus three 2260 CRTs "that took up 50K" in the company's 360/40 under DOS.

The conversion process was simple and there was very little problem in changing the programs to read tape input instead of cards, Jenkins said.

Throughput is up by 25%, Jenkins said, since operators are much more likely to correct an error on the spot.

Jenkins reported that Macke has had "15% to 20% fewer service calls" with the 3742s compared with the key/verify equipment.

George Nakada, manager of administrative data processing at Lockheed Shipbuilding Co. also pointed out that, three 3742 dual key-to-diskette stations cost his company about the same as six single 029 keypunches. The penalty, he said, lies in the cost of the necessary 3540 or 3747 data converters.

The increase in card costs made up for that differential, Nakada said. "Our card costs . . . have gone up from $.92 a thousand to $1.80" in the past year.

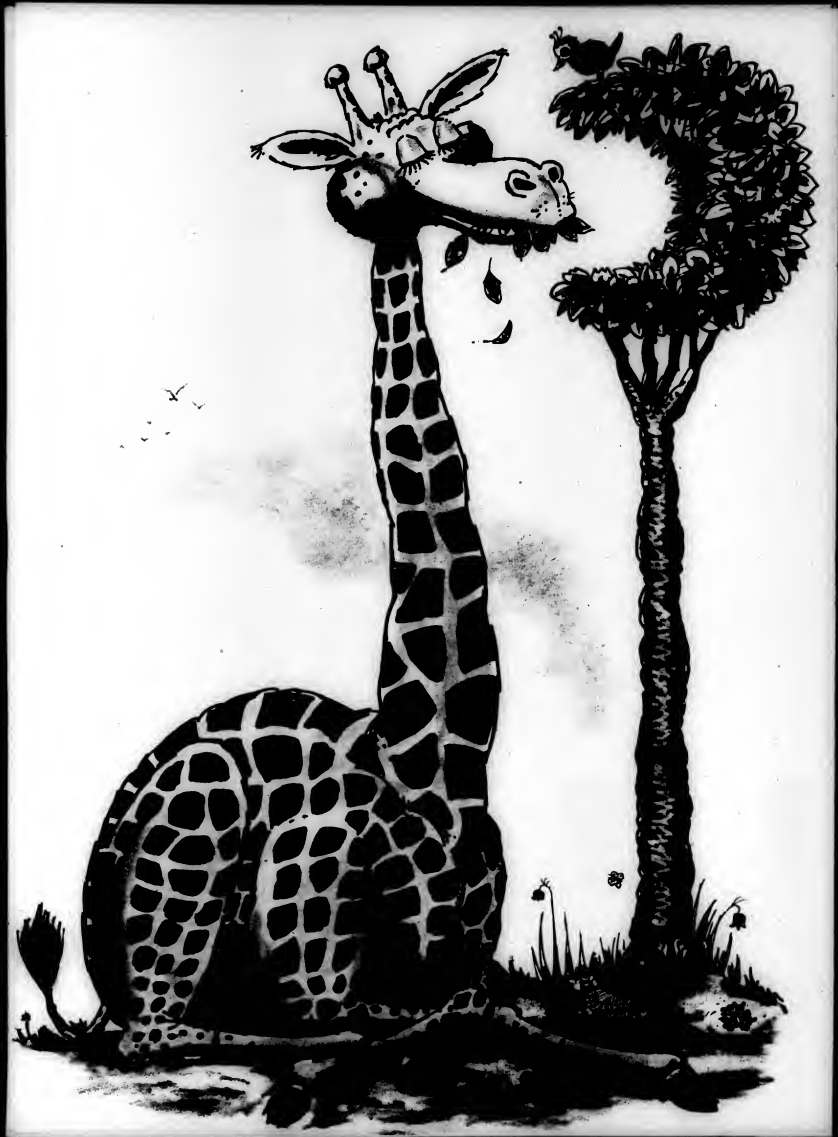
Nakada said he also considered key-to-disk systems, but ruled them out because a shared processor failure would bring data entry work to a halt. This can't happen with the 3742s, he said.

Nakada said his company began doing card format data entry through the 3742s, but then switched over to block record input through the 3540 diskette reader to boost throughput.

Overall throughput is now up by about 20%. The 3742s themselves are faster than keypunches, he said, but the 3540 is also "three to four times faster than a card reader."

The Lockheed shop now processes about 30,000 record/week. Union agreements require the DP shop to do payroll daily, and Nakada mentioned that the 3742 operators save keying by finding the person's payroll record on the diskette and then updating it from the employee's time card.

Whether the 3742 is an economical data entry device "depends on how you use it," Nakada commented. As a straight keypunch replacement, the devices don't increase throughput to any great extent, but if the user takes advantage of their capabilities, such as blocking records, he can achieve considerable throughput gains, Nakada concluded.



Relax...

System 1303 takes the hassle out of data entry.

Need to speed throughput? Cut down errors? Reduce corrections? The Inforex System 1303 is your answer... the key-to-disc system with processing power at the point of data entry.

Automatic functions assume much of the responsibility for first-time accuracy to reduce costly data validation and correction.

Tape Update In Place, an Inforex exclusive, lets you do file searching and update in place on both tape and disc. Eliminates time-consuming transfer operations.

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Crossfooting-This function allows operators to test balance field accounts for accuracy at the end of a record, page or batch. Automatically.

Field Editing lets operators be sure only appropriate characters are entered into fields... helps catch errors before mainframe processing.

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Fewer keystroke requirements mean faster input.

Level-to-Level Duplication, automatically duplicates information from one record level into the next record with the same program control level... saves operators from rekeying the same field over and over again during data entry ...reduces the potential for errors, too.

Reformatting simplifies data capture by allowing information to be keyed exactly as it appears on the source document. User-defined program controls automatically restructure the data into computer-compatible formats.

Simple to learn, easy to use — for a more productive operation.

Operators become fully productive in just a few days. The System 1303 comes with a *CRT Display* for system status messages and fill-in-the-blank prompting, plus the quiet, solid state, standard data entry *Keyboard* for noiseless operation.

And you get more than just data entry, too.

The BISYNC feature provides communications for local or remote locations, to and from IBM 360/370 computers, or other compatible BISYNC devices, at speeds to 9600 bits per second. Plus *Serial* or *Line Printers* for hard copy output. For System back-up, the *Keystation Channel Switch* allows keystation switching between control units for easier job distribution and greater uptime. And Inforex maintains sales, field service, and training personnel in major cities throughout the United States, Canada, and Europe. Distributors worldwide.

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INFOREX

Averbach Guide Outlines Alternatives

Equipment Choice Depends on Speed, Cost, Design Needs

By Jan Snyders
Special to Computerworld

Data entry accounts for between 20% and 40% of all data processing costs, making it an important task for the DP manager to select the equipment that can best handle his particular applications.

The standard keypunch is still the logical choice in many installations today. However, keypunch replacements have been finding their way into a greater number of installations at a faster growth rate since the early 1970s than any time previously.

Although there has been some increase in buffered keypunch, key-to-storage systems show the greatest growth with an increase of more than 50%. Auerbach's *Guide To Key To Storage*, points out these systems can offer a 20% to 40% increase in data entry throughput with substantial reduction in user costs.

A key-to-tape system contains a keypunch keyboard, tape transport, a buffer and associated logic. Details of a station vary with different manufacturers; frequently printers and visual display screens are added.

The buffer and logic circuits control data entry, formatting and display operations of the station.

Variations of the key-to-tape stand-alone machines use cassettes or cartridge tapes as an intermediate medium, which is pooled onto a 1/2-in. computer-compatible tape either by manually carrying the tape to the pooling station or with an on-line connection to the pooler.

Key-to-disk systems are really key-to-disk-to-tape systems in which the processor is enhanced by the addition of disk memory. Each system consists of multiple keyboard terminals, a supervisory terminal, a small computer, a magnetic disk and a tape drive. The number of terminals ranges from eight to 64, although most installations have between seven and 16.

Multikeyboard stations connect to the shared processor. The disk memory contains format, program library and operating system routines and serves as a mass storage area for keyboard station input. After processing and formatting, data is transferred from the disk to the single computer-compatible tape.

Because of the power of the key-to-disk processor, features such as document status, keyboard utilization and operator efficiency reports are possible.

OCR/OMR Units

DP managers may feel that the switch from card to key storage is relatively simple since the input units are similar enough so a trained operator can quickly learn to operate them.

However, keypunch replacements still require an operator to key and verify the information. This step could be eliminated by scanning equipment such as optical character readers (OCR) or optical mark readers (OMR), which read handwritten, printed or typed information directly from the source document.

One of the major problems with these units stems from the amount of resystemizing required. In converting to OCR/OMR, the user has to think about redesigning forms to fit into the system as well as the font or code that will be read by the units.

If the manager can overcome these initial problems, he will discover that his keypunch units can be replaced by typewriters and that the typist is usually faster and more accurate than the keypunch operator.

True source data automation is capturing the data without any need for retranscription. The various approaches include OCR and OMR devices and also optical bar-code readers (OBR). The OMR recognizes hand-entered mark; OBR recognizes bar codes placed underneath the characters.

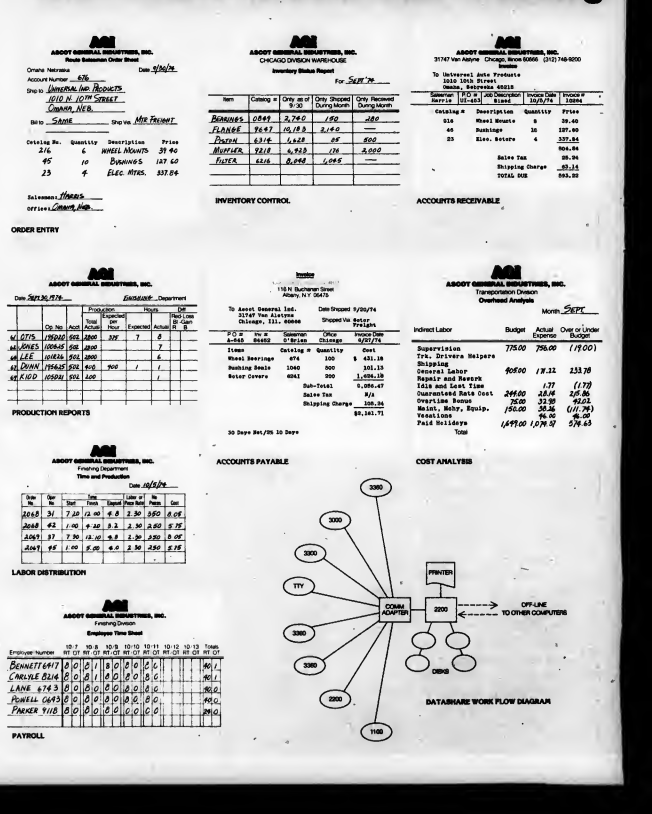
Of the three, the most widely used is OCR, which recognizes characters from typed, printed or handwritten paper or from film.

OCRs consist of six basic elements: a feeder/transport unit, a scanner, a recognition unit, a controller, an output stacker and data output units.

With these units, there are two

(Continued on Page S/15)

For Multi-Application Multi-Location Business Data Processing:



Available Equipment as Varied as Needs

(Continued from Page S/14)

basic modes of operation. When the generation of source data can be controlled, a Direct Read mode is used in which source documents are read by OCR equipment directly. When the generation of source data cannot be closely controlled as to the type font used, quality of printing, size of documents, etc., a Retype mode is used in which some or all of the source data is retyped on standard pages using the appropriate type font.

In the Direct Read mode of operation, the highest degree of success is obtained when documents come from sources that have imposed strict controls on form, format and type font. These include journal tape outputs from adding machines and cash registers, credit card transaction slips, airline tickets, carefully handprinted meter-reading forms and others.

Strict input controls are not always possible because of the particular data generation source (for example, customer purchase order), and the Retype mode has therefore been developed to accommodate all types of documents. Source documents not up to quality control standards are completely retyped to machine-readable standards.

From the latter mode of operation, the ultimate in source data handling was born. Although OCR is one of the fastest means of data entry, it does have a problem of rejects and the handling of these brought about the marriage of OCR with key-to-storage.

The OCR portion of the machine handles input data recorded in OCR-readable forms; the key-to-storage portion handles both rejects from OCR reading and source documents recorded in non-OCR readable fonts. This is possible with the use of a minicomputer as controller and special software.

Depending on the manufacturer, these systems are called multimedia systems, mixed media systems or total data entry systems.

Scan-Data Corp., Cummins-Allison Corp. and Recognition Equipment, Inc. (REI) led the way with this type of equipment. IBM, Entrex, Inc. and Bell & Howell have since entered the race.

The three original systems were designed to solve the same problem, but each presented different approaches and different emphases. For instance, REI's Total Data Entry is marketed as an optional feature for the Input 80 OCR reader, primarily allowing users of the high-volume OCR page reader to gain the additional key entry capability.

The Scan-Data 2250 is more like a system developed to handle both OCR-readable and non-OCR-readable data. The system consists of an OCR reader for scanning readable data, a CRT-type key station for handling OCR rejects and a non-CRT keystation for entering non-OCR readable data.

Available software allows key entry of certain data from a document followed by OCR scanning of certain data from the same document merged on the output tape. Reentry of OCR rejects can be done with little or no impact on scanning throughput.

Cummins-Allison, with its background in mark-sensing equipment for turnaround documents, designed the 4400 to handle turnaround documents. The system consists of a document and ticket scanner and a number of CRT-type keystations for entering data from documents that cannot be accepted by the scanner.

Of the three new entrants, IBM is the only one to follow the pattern set down by the original suppliers. IBM added a video-collect feature to its Model 3886 OCR which is already in use. The video-collect features allows recognition and correction of rejected characters without references to the documents and visual display and operator verification of critical information.

The 3886 can capture and display hand-printed alphabetic or printed non-OCR fonts, allowing key entry of data by the operator, and can create signature files, permitting banks to display and verify depositors' signatures.

Entrex entered through the back door. This company, already entrenched in the key-to-storage field, added optical scanning to its 480 system. Documents to be scanned are batched and read with selected errors entered in the data records as the system error flags. The errors are corrected later.

The RPS 350 from Bell & Howell is the latest addition to the line. The system uses both optical character recognition and keyboard input to record and balance individual remittances. The system provides audit trails to simplify rechecking in answer to customer queries or to reconcile accounts.

Snyders is an editor with Auerbach Publishers, Inc.

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The EDP Seminar Series gives you the information you need to keep ahead of this fast-changing industry.

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Includes SDLC, HiD-LoD, and other topics that weren't even heard of a year ago.

Data Communications is a complicated and rapidly changing field. And this seminar will give you the information you need to keep on top of the subject. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers and specialized carriers.

The course will also cover general data communications topics, including intelligent terminals (performance and selection criteria), network software handlers (e.g. CICS) and network organization and design. And, you'll learn about saving money using such innovative concepts as split-stream modems, remote-multiplexers/concentrators, diagnostics for fault isolation and front-end processors.

All participants in this seminar will receive a 2-volume loose-leaf outline of all course materials (prepared by ICC Institute), a copy of "Data Modems Selection and Evaluation Guide" by Vese V. Vitips and a "Data Communications and Teleprocessing Dictionary".

You should attend this seminar if you are currently involved in data communications on a management or operational level and wish to expand your knowledge of the field – or if your company will be going into this area in the near future.

This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350.. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows:

Chicago Hyatt Regency O'Hare November 4-5
Miami Miami Marriott December 2-3

Data Base Management

A practical approach to the design and implementation of data base systems.

The difference between an effective data base system and a waste of computer time and memory lies in effective planning, system selection and management. And this course gives you both the information and the basic experience you need for the proper design and implementation of a data base system.

Given in association with Leo J. Cohen and Performance Development Corporation, this course covers a comprehensive list of topics, including:

- *the description and definition of the Data Base System Project.*
- *the development of a full service analysis and system design.*
- *optimum file organization and indexing techniques.*
- *all available indexing techniques and their implementation.*
- *all aspects of system management.*
- *and much more.*

One of the key features of this course is the workshops, in which you'll apply what you've learned. And before you're finished you'll have "done" a complete, on-line order entry/inventory management system.

You should attend this seminar if you are (or will be) involved in the design and implementation of a data base system – whether as a DP Manager, Data Base Administrator, Planner, Analyst or Programmer.

This course runs for 3 days, and costs $350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule:

Chicago Playboy Towers November 18-20
Denver Denver Hilton December 9-11

Contracting for Computers and EDP Support Services

A seminar that can help you protect your EDP investment – and your system.

In an industry that's famous for its "promise them anything" attitude, you need good, effective contracts from the vendors that supply your installation. And this seminar gives you the information you need to get them. It will show you how to protect your installation from late deliveries, inadequate equipment or services and the costly disruptions that they can cause.

Course topics include the lease and purchase of computer systems, separate hardware and software – the purchase of time sharing, data processing services and consultation – and the use of facilities management.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author and expert in the field of computer law, you'll learn how to place yourself in a strong bargaining position, how to insure on-time delivery of exactly what you want, how to set reasonable performance standards for warranties – and much more. You'll also receive a complete resource notebook, including sample vendor contract forms.

You should attend this seminar if you are involved in the purchase of EDP equipment or services, whether as a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm.

Cost for the entire 2½ day seminar, including complete resource notebook, continental breakfasts, luncheons and coffee breaks is $295.00. The current schedule:

Chicago Hyatt Regency O'Hare December 4-6

How to Draft Effective Legal Agreements Relating to Computer Technology

A one-day workshop for non-legal technical people

For a variety of reasons, computer users and computer manufacturers often use non-legal people to draft agreements. These agreements are used for specific transactions and as "standard forms", and they can cause significant problems. It's easy to overlook important legal points – especially if you're not a lawyer – and this workshop is designed to give you the basic knowledge you need to avoid the pitfalls.

Conducted by Roy N. Freed, course leader of our comprehensive contracting seminar, the workshop includes the following topics: Purpose and functions of formal agreements; architecture of agreements; language caveats; use of forms; checklists and outlines; suggested writing style; sources of applicable legal rules; sources of assistance; and more.

Cost of the workshop, including resource notebook and lunch is $135. Current schedule:

Boston Sheraton Boston November 20th

sponsored by

Key-To-Disk Systems

How to evaluate and optimize the most common successor to keypunch equipment.

Data entry is a big problem – and a big headache – as every computer user knows. And key-to-disk systems are one of the most popular methods of improving efficiency in this area. So this course is designed to help you in the practical aspects of selecting, installing and making the best use of key-to-disk. Topics include:

- *key-to-disk hardware and software.*
- *starting a key-to-disk system.*
- *data entry system design.*
- *key-to-disk as a remote batch terminal.*
- *operating a small key-to-disk system.*
- *improving productivity.*
- *trends in computer data entry – including multi-media*

This seminar is lead by Lawrence Feldelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry.

You should attend this seminar if you are considering (or currently using) key-to-disk systems. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons and all course materials. Additional registrants from the same company are charged only $300.

Current schedule:

New York City Waldorf Astoria November 11-13

To: Ed Bride, Vice President, Editorial Services, Computerworld
797 Washington Street, Newton, Mass. 02160

Please send me a brochure and registration form for the following seminar(s):

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Uniform Application Procedure

Punch Cards Hold Fate of UK Collegiate Aspirants

CHELTENHAM, England – Punch cards used as a turnaround document are the key to the UK's college admissions procedure.

All applications and decisions come through an organization here called the Universities Central Council on Admissions (Ucca) and punch cards are used to automate decision recordkeeping.

Established in 1961 to coordinate admissions through one uniform system, Ucca received applications for undergraduate programs from over 125,000 candidates during the past academic year.

Data for the first card is keypunched.

Since most individuals applied to five separate universities, the organization actually handled a total of almost 600,000 applications.

Rather than being overwhelmed by mountains of paperwork, Ucca handled the job with 14 Univac 1710 keypunch/verifiers and a Univac 9480 computer system.

The computer is a central clearinghouse of information, and the cards offer a simple communications medium between Ucca, the candidates and the universities.

University selectors, Ucca and candidates use the same card to mark their decisions or receive information. At the center of the nationwide system, coordinating the entire process, is the computer, updating records and supplying printouts of the latest data.

"This card system eliminates a cumbersome process of individual correspondence and paperwork," commented James Wise, who directs DP operations at Ucca's headquarters here.

"It would be slow strangulation otherwise, as the number of candidates continues to climb."

Cards are read into the 9480.

Wise pointed out that Ucca installed a Univac solid-state computer in 1962, a 1050 in 1966, a 9400 in 1970 and its current 9480 in September 1973.

Eighty-four universities and colleges, virtually all in the UK, use the Ucca system.

The basic system, using cards and computer, begins operating each year between September 1 and December 15 when candidates send a short application form indicating, in order of preference, up to five choices of universities and the courses which they prefer. The computer prints out a letter of acknowledgment.

Forms Microfilmed

Ucca microfilms the forms, enters the information on a punched card and enters the data into the computer's Univac 8425 disk file records.

From then on, punched cards inform university, Ucca, and student, as decisions are made.

Ucca sends a small copy of the application form, with a "decision card" and a "record card," to each univeirsty named by the candidate. The university selects and returns the decision card to the council. A code mark shows whether the candidate will receive an "unconditional offer," based on having fulfilled all entrance requirements; a "conditional offer," subject to a certain performance – also coded on the card – in the General Certificate of Education (GCE) examinations during the following summer; or whether his application is rejected.

Back at Ucca, the decision is recorded in a disk file and the card is sent on to the candidate, if it holds an offer, with another computer-printed letter. (Re-

(Continued on Page S/18)

Data is maintained on Univac 8425 disk packs.

Punch Cards Hold Fate of UK Collegiate Aspirants

(Continued from Page S/17)

jected candidates receive only a letter.)

Four Choices

The candidate is then free to make one of four decisions on the card. He may accept an unconditional offer, to which both he and the university are usually irrevocably committed; he may firmly accept a conditional offer, binding himself to this university if he meets requirements; he may "provisionally accept" a conditional offer, meaning he isn't ready to fully commit himself; or he may decline and still receive offers from other universities.

"One of the advantages of the conditional offer system," Wise explained, "is that a candidate knows exactly what's expected of him before he takes the examination. He's entitled to this information and it's a good incentive."

The candidate has seven days to make his decision, which he marks with a code number on the decision card and returns to Ucca. The new data is punched and entered into the 9480's records, and the original card is returned to the university.

Status Report

The computer informs all universities concerned of the candidate's decision on a monthly printout showing his position at all the universities which he has chosen. The institutions, however, receive an immediate multipurpose card with the new information if the candidate firmly accepts an unconditional offer.

The universities make their decisions – and inform candidates through Ucca – throughout the winter and spring. All applications still outstanding after May 1 are recorded in the computer as rejections.

Computer operator starts the update program.

The punched cards – and the computer – begin a new round of activity after the universities receive results of examinations in July and August. The universities make their decisions on conditional offers and, once again, send them to Ucca.

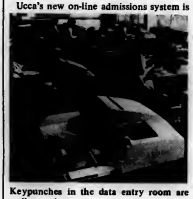
This time, the punched card completes its journey at the computer center. The 9480 records the decision and prints a letter informing the student of the decision.

Candidates who haven't received confirmed offers may still be considered for vacancies through a special clearing operation in August and September.

Ucca sends "clearing cards" to the universities with the latest information from the computer on the candidate's status, including his examination marks. The university then informs the candidate directly, returning the card here to update computer records.

Further Efficiencies

Ucca's new on-line admissions system is



Keypunches in the data entry room are well spread out.

providing even further efficiencies for the eight universities who have installed terminals. These may, for instance, enter decisions directly into the 9480, receive immediate current information about an applicant's record or request an analysis of all applications according to category.

Seven of the on-line universities use Univac DCT-1000 data communications terminals with a card reader and printer.

The eighth uses a Univac Uniscope 100 visual display unit with a printer and a Model 610 tape cassette system.

System Configuration

The computer center at Ucca's headquarters here receives about 1,094 on-line and 6,000 off-line messages on a typical day.

The present configuration of the disk-oriented 9480 system includes a central processor with 196K bytes of storage, six 8425 disk drives with a total capacity of 360M bytes, a data communications subsystem with 16 communication lines, two 1,100 line/min printers, one 80-column card reader, one 80-column card punch and two Univac 12 tape systems.

In addition, a Uniscope 100 unit with special printer is used in-house for inquiries to the computer records.

Approaches to Intelligent Devices Becoming More Alike

By Patrick Ward
Of the CW Staff

NEWTONVILLE, Mass. – The trend among data entry users is to choose intelligent devices, either key-to-disk systems or intelligent terminals, and these two approaches are becoming increasingly similar, according to studies by International Data Corp. (IDC), a market research firm here.

Users want to shift mundane data entry overhead from their mainframes onto their data entry systems, IDC reported. And with company DP work becoming more centralized, users are turning to "distributed processing" to replace small computers at remote sites with intelligent terminals that can communicate with the central installation.

IBM's backing of its buffered keypunch has given the punch card approach a new lease on life, IDC noted, adding punch cards are at their best for short files requiring frequent changes, such as in program maintenance, for turnaround documents for billing and in cases where it is useful that the card can be easily filed and ready by either man or machine.

But keypunch shops still have problems in coping with large volumes of data within acceptable turnaround time. Adding more keypunches requires a lot of space, IDC noted, and there is a shortage of good keypunch operators.

Unsatisfactory error rates, as well as problems with equipment reliability and flexibility, also limit the keypunch approach, IDC said.

Users in centralized DP sites have often turned from punch card equipment to key-to-tape systems, but more efficient and cost-effective key-to-disk systems will continue to displace key-to-tape in larger installations, the research organization predicted.

The trend to dispersed data entry has brought a steady rise in the percentage of key-to-disk systems ordered with communications options. But these systems, in turn, face competition from IBM 3270-type CRT systems at central sites, while the intelligent terminals have proven attractive at remote sites or in small companies relying on a service bureau.

Intelligent Terminals Preferable

As IDC defines it, intelligent terminals share four common elements:

- They are designed as general-purpose devices, although their capabilities might make specialization possible.
- The terminals are operator-oriented, with the keyboard the primary means of input.
- The terminals are in a satellite arrangement with a larger central processor.
- Finally, all the terminals offer user programmability through random-access memory. This means the end user of the true intelligent terminal can write and compile programs without assistance from the host computer, IDC noted.

Cost is a chief factor in choosing intelligent terminals for data entry applications, the IDC study found. For example, if the necessary processing capacity does not justify a minicomputer or small business system, the intelligent terminal becomes the most economic choice.

A shared-processor data entry system or an IBM 2780-type remote batch terminal

(Continued on Page S/20)

Whither IBM?

NEWTONVILLE, Mass. – IBM has not yet entered the intelligent terminal field in force. This helps the independents by leaving the field open to them, but it also paradoxically hurts them by withholding IBM's blessing from the intelligent terminal concept.

The intelligent terminal approach to data entry runs counter to the IBM philosophy of maintaining centralized data processing control, according to International Data Corp. (IDC).

Instead, IBM offers users a number of alternatives including the 3735, the 3740 Models 3 and 4, and the 3790, IDC noted in a recent study of the intelligent terminal market.

The 3735 has never achieved significant popularity, IDC stated. Although programmable, the device is totally tied to the mainframe in utilizing data entry capability, IDC said.

The 3740 Models 3 and 4 "are intelligent in and of themselves, but IBM doesn't call them terminals," IDC reported. Additionally, the marketing research firm questioned whether their Application Control Language software is geared to the uninitiated user.

The 3790 has more intelligence than the 3735 programmable terminal but still relies on the host computer for compilation. "It appears to be a remote communications processor/peripheral controller more than an intelligent terminal," IDC stated.

The problem appears to be "one of letting the user decide what peripherals, terminals, etc. [the user] wants to hang on the 3790 itself."

Although IBM does not offer a true intelligent terminal product for data entry according to IDC's definition, the industry giant emphasizes keypunches for data preparation, 2780s and 3780s for remote job entry (RJE) use and 3270s for inquiry, along with its stable of industry-oriented terminals, IDC noted.

Actually, "an all-out push by IBM with an intelligent terminal product like the 3740 models 3 and 4... could only serve to benefit the market's current suppliers," IDC reasoned, since IBM's entry would bring massive user education in the potential of the intelligent terminal approach.

On the other hand, IDC stated, IBM "could shut the smaller suppliers almost entirely out of the market... By locking users in through specialized application-oriented teleprocessing subsystems, [IBM] could make participation by independent suppliers too expensive to be profitable."

Calif. Company Happy It Rediscovered the Keypunch

HAYWARD, Calif. – Shaklee Corp. has found a data entry method that provides greater throughput than direct entry at a lower cost: the company has rediscovered the keypunch.

Shaklee had installed 12 IBM 2260 CRTs and a backup of five IBM 029 keypunches in January 1972 to speed up entry of the 400 to 500 orders coming into the company daily from its distributors.

The system was somewhat of a key-to-tape approach since the company's 256K IBM 360/40 under DOS collected orders on tape for later batch processing.

But several disadvantages put an end to Shaklee's venture into direct entry, according to Lionel Cirilo, director of management information systems.

A crucial drawback, he said, was that the Customer Information Control System (CICS) teleprocessing monitor tied up 98K of core.

The eight-second response time on the CRTs meant operators were left "sitting there waiting for the computer," and adding more operators only worsened the problem, Cirilo remarked.

Finally, when the CPU went down, all data entry through the CRTs had to halt.

The return a year ago to off-line data entry on nine Tab Products keypunch/verifiers solved those problems, Cirilo said. Recent comparisons show that six keypunch/verifier operators are nearly doubling the daily production average of 12 operators on the CRT system. Six keypunch/verifier operators have processed 724 orders on their machines compared with a high of 406 orders with eight operators on the CRT system.

Cirilo said his installation compensates for the on-line system's checks and edits with an exception edit listing from the CPU. These exceptions go into a pending file on the CPU; only the corrections are entered, he noted.

Data coming from the keypunch/verifiers is about 99% correct, Cirilo said. The equivalent figure for the CRTs was 90%, he noted.

The Tab Products keypunch/verifiers are similar to IBM's 129 buffered keypunch but have a small price advantage, he said.

Voice in the Future

Cirilo considered key-to-disk devices but installed the keypunches as an interim step toward a voice-response order entry system which the company may install next year.

Under the system, an audio response device would guide the company's 3,000 distributors with direct order privileges in entering item numbers and quantities over Touch-Tone phones.

Shaklee retains five IBM 3270 CRTs for inquiries but has replaced CICS with the Swift teleprocessing monitor from GBA, Inc., which Cirilo said needs much less core. The installation also uses the Grasp spooler from Software Design.

Half of the 360/40's 256K is add-on memory from Standard Memories, Inc. There are also tape drives, disk drives and a printer from Telex.

The return to keypunches have saved his DP installation the cost of six people and six CRTs, "in addition to getting half the computer back during the day . . . ." Cirillo observed.

But the biggest thing, he concluded, "is that we're getting the orders through more rapidly.

Data coming from the keypunch/verifiers is about 99% correct . . . The equivalent figure for the CRTs was 90%.

Users' Approaches Becoming More Alike

(Continued from Page S/19)

might cost less, but the intelligent terminal buys the user greater flexibility, IDC stated.

Savings in line costs make the intelligent terminal preferable to on-line devices in remote locations, IDC added. Additionally, the terminal's intelligence allows data entry and possibly even some inquiry to go on when the central site is down.

Users to whom IDC talked who were doing data entry through intelligent terminals, cited fast information turnaround and clean data entry for applications without real-time requirements.

Most of the users already had printers but would like smaller, quieter ones. IDC found the users were particularly interested in increased speed and off-line unattended printing capability.

Floppy disks and new devices such as badge readers for data access authorization also intrigue users, IDC said.

Although airlines were among the first users of intelligent terminals, IDC found they generally are doing the least exotic things with them, although the addition of seat selection and document-printing capabilities will take fuller advantage of the capabilities.

Banks do a wider variety of tasks on their terminals. One bank queried in the study listed savings, mortgages, installment loans, demand deposit accounting, central information file and general ledger as just some of its applications.

Hospitals have become some of the most sophisticated intelligent terminals users, according to IDC. One approach is installing terminals throughout the hospital and configuring them to the needs of the location.

For example, the pharmacy requires printing capability to receive orders and label drugs and admissions needs forms printing for insurance companies.

The main suppliers of intelligent terminals have lately been moving towards a full terminal product line, and some users IDC interviewed planned to adopt a single-vendor approach. However, IDC found that this selection criteria was overshadowed by the vendors' service/support capabilities and the flexibility of the product itself.

Now Has Seven Systems

'Card Crunch,' Noise Impelled Change to Key-to-Disk

Pratt & Whitney reduced the number of its keystations from 85 to 56 but reported an average gain of 22% in throughput when it switched to key-to-disk systems.

EAST HARTFORD, Conn. – "After our keypunching operation exceeded 100 machines, it put a real strain on our computer systems.

"We were worried that our computers might become input-bound unless we reduced the card crunch immediately. Keypunching was no longer a viable solution.

"Besides, the noise from all those keypunches and verifiers was deafening."

That's a recap of the situation at Pratt & Whitney Aircraft before the company started to convert to key-to-disk data entry equipment in 1971.

Today, according to Francis Schillinger, manager of computer operations, the company uses seven key-to-disk systems with a total of 56 keystations to prepare three million records a month.

The Information Systems Department is responsible for most business-oriented data processing at Pratt & Whitney. Operations are characterized by a high volume of data input and output with relatively low mainframe processing.

As a result, the I/O functions and, specifically, the key-to-disk function play a major role in the company's computer processing and reporting.

To handle the massive flow of information, data is prepared and entered into the computer system in many forms – from magnetic tape, punch cards and disk drives. For input equipment, Pratt & Whitney uses teleprocessing systems in addition to the key-to-disk data entry systems.

Cost/Performance Ratio Improved

The first system arrived in October 1971, with one additional system arriving each month from January through June 1972. The company also decided to double the density of its tape drives from 800- to 1,600 bit/in. during this time.

Altogether, 85 IBM keypunch/verifier devices were replaced by seven Inforex shared processors and 56 keystations.

Each key-to-disk system includes eight keystations with a preprogrammed shared processor and a system disk drive that stores up to 18,000 records of 125 characters each.

According to Schillinger, "We chose this key-to-disk system for its excellent cost/performance ratio. Aside from the obvious savings in storage space, we were really looking for greater throughput for our money.

"Computer-compatible tape output saved us extra processing steps, too. The success of any system is determined by its routine operation. After three years, we have never scheduled overtime as a result of equipment malfunction. The reliability

(Continued on Page S/23)

Attachments Permit Wider Range of Tasks For In-Use Keypunches

By Rose DiGiacinto
Special to Computerworld

The keypunch machine's most familiar job is to punch data onto punch cards that will be used as input files in data processing operations.

There are a variety of attachments from IBM and independent suppliers, however, that permit an IBM 024, 026 or 029 keypunch to do a wide variety of tasks besides its basic ones. Most of these attachments can be installed on machines already in use.

Variable-length feed features, for example, are available and allow any of the three IBM keypunches to process 51-, 60-, 66- and 80-column cards.

A interspersed gang-punch feature can enable the keypunch to sense cards by upper left or upper right card corner cut difference.

And an auxiliary duplication feature allows automatic punching of information from two cards.

If the user wants to punch cards that are thicker than normal card stock, he can order a postcard stock feed feature.

A marked feature will feed only multiple cards into the machine, and a high-speed skip feature will skip past nonpunched fields at three times the normal speed.

There are also interfaces which allow minicomputers to use a keypunch for direct card output.

Enhancements relying on added memory can check for errors during the keypunching process. Similar enhancements will interface IBM keypunches with non-IBM equipment; long-range data communications equipment can be interfaced with the keypunch, too.

Other available features include a zero fill insert feature which automatically punches zeroes to the left of the highest number of a field, and an interpreting feature that allows the keypunch to print at the top edge of the card information previously punched by another keypunch machine.

DiGiacinto is president of Specialized Electronics Corp.

Ask 'Must This Be Done?'

Functional Analysis Can Turn Up Hidden Costs Easily

By Robert J. Leydon
Special to Computerworld

Just as data entry technology has tended to lag behind technology in the mainframe area, the cost evaluation and control techniques used in data processing generally have not been applied to the data entry function.

Some progress has already been made in identifying the true costs in data entry – for example, no one would consider the key entry/verify operators' gross hourly rate alone as the total personnel cost.

The fully burdened operator costs would include the employer's expenditures to provide Fica matching funds, unemployment insurance and "fringe benefits" which can be 10 or 15 line items (vacation, sick leave, life and health insurance, retirement pension, etc.).

Other readily evident costs associated with data entry operations are the equipment rental and maintenance cost, supplies (cards, tapes, forms) and general overhead (floor space, heat and light).

A good cost analysis of any operation should be preceded with a functional analysis; the question to be asked is "Must this be done?" before attempting to find out "How much does this cost to do?"

The first two hidden cost items which can often be eliminated if examined from a functional requirements standpoint in light of today's key-to-disk equipment are:

- Verifying costs. One can easily determine what it costs to key verify data, but why even bother to key verify at all?

Available data entry equipment can provide an array of verification techniques (check digit, cross footing, table look-up) which should allow the elimination of the key verify operation.

If one is uneasy about eliminating key verification, he can run both the manual and machine verifications in parallel; as confidence increases, redundant keying can be decreased.

- Shop control. In addition to a data entry supervisor, there are usually some clerical personnel who provide supportive functions: batching and logging in source documents, preparing adding machine batch totals, monitoring work in progress.

Most key-to-disk systems can automatically provide these functions as a by-product of their basic data entry role.

Other hidden costs to keep in mind are:

- Training. The costs associated with training a key entry operator are usually underestimated because new operators are trained to only key enter on one or two applications.

With the passing of time the operator will be trained for other applications and on key verification. The cost of this "spread training" can equal or exceed the cost of providing a five to 10 day comprehensive training course initially.

In a typical data entry operation, the turnover rate is 50% yearly, so the training procedures and costs are worth investigating.

- Error correction cycle. A number of conflicting dollars-and-cents estimates have been made regarding the cost of correcting an error in data entry as opposed to correcting the error which reaches the mainframe computer. This much is known: both errors cost money, and the errors which reach the mainframe will be 10 to 100 times the cost of an error detected within the data entry shop.

- Reduced mainframe processing. Cost savings in this area often are not investigated because even an allusion to mainframe reprogramming raises the specter of stubbled faces at three o'clock in the morning.

However, cost savings can be obtained by minimizing mainframe edit programs (at least on new applications) through preprocessor edits performed in the data entry shop.

The dollar savings to be realized in the data entry area are dramatic because the new tools provided by shared-processor data entry equipment can be applied to the problems of key entry which have been, in general, long overlooked.

Robert J. Leydon is a product marketing consultant with Entrex, Inc.

Card Crunch, Noise Impel Conversion To Key-to-Disk

(Continued from Page S/21)

of our Inforex systems has been very satisfactory to date."

Data From Eight Departments

Eight major departments at Pratt & Whitney input source data for key-to-disk data preparation. A total of 500 or more data formats are required to serve the needs of these departments, which support jobs with cycles varying from daily to annual.

After two years of operations, with the key-to-disk equipment, processing three million records monthly, the company reported data throughput has improved 13% to 27% with an average improvement of 22%.

To keep jobs moving, the data entry systems perform daily batch balancing and disk-to-tape transfer at intervals of every 4,500 records.

The Inforex system function, Tape Continue, is used as a special processing addition to the work flow. This function allows Pratt & Whitney to maintain its on-going reports, updated daily and weekly.

With the Tape Continue option, operators can find their place instantly on the tape each day through a special system identifier. Work proceeds faster on these infrequent reports, saving valuable time and space for additional source data, the company said.

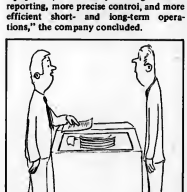
System throughput as well as group efficiency and accuracy reports are available without interrupting the work flow. Familiarity with the systems has allowed the training period to be shortened, with improved accuracy, and greater throughput and less document handling has been achieved than with keypunching, said Schillinger.

In addition, special Cobol programs are available for use with key-to-disk generated statistics for further computer evaluation and management reporting.

Operators and supervisors reported the systems are much quieter, and they found people can key faster and setup times can be minimized.

With the systems, programs are stored on disk and are called up by command. Then keying can commence. Enough keying sound has been added to maintain keying rhythm.

"The daily data entry operations have helped simplify and improve the control of our data input and our expediting function is more efficient and effective. So when we look at a 22% increase in data throughput with the key-to-disk equipment, we're really looking at faster reporting, more precise control, and more efficient short- and long-term operations," the company concluded.



"According to this list, disk pack 5 should contain payroll, personnel records and Brubeck at the 1963 Newport Jazz Festival."

Every Department Gets a Piece of the Action

EAST HARTFORD, Conn. – Pratt & Whitney's key-to-disk applications run the gamut of systems for all major departments, according to Francis Schillinger, manager of computer operations.

The key-to-disk devices, for example, now handle part of the company's payroll as well as receivables, product support and some financial planning.

In the production department, key-to-disk operators enter some production information as well as projects for the plant engineering and master mechanics.

But the trend both for this company and other users seems to be toward shifting at least part of the key-to-disk work load to other devices, Schillinger said.

He noted that 16,000 Pratt & Whitney production department employees use 600 Singer data collection terminals to enter 64,000 attendance records and 80,000 job transactions daily.

The tutorial terminals lead the operator through the data entry process, Schillinger said. The data this network collects supports 19 applications, half for production department use and the rest for financial systems.

The data collection devices in the production department alone save a tremendous amount of keying, Schillinger observed. The concept is now being extended to other Pratt & Whitney departments.

More of the company's key entry applications are being handled through on-line terminals in the user organizations, and in the future the company may go to stand-alone intelligent terminals with diskettes or tape cartridges, Schillinger mentioned.

The company's increased use of intelligent terminals and on-line CRTs in user departments would cut down on "transportation of paperwork back and forth and may very well eliminate some scheduling bottlenecks as a result of trying to batch process," Schillinger said.

He added it would not surprise him to see key-to-disk systems in use that connect directly to the computer.

Pratt & Whitney has not found sufficient payback in scanning devices, the manager of computer operations said. Whether scanning takes an increasing share of work from key-to-disk data entry will depend on how scanning technology progresses, he concluded.

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COMMUNICATIONS

IBM 3660 Supermarket Test Draws 'Positive Reaction'

By Ronald A. Frank
Of the CW Staff

MONTREAL – One of the first large-scale tests of the IBM 3660 supermarket terminal system has drawn a "generally positive reaction" from customers.

The evaluation was made by Arnold Sobrian, assistant director of point-of-sale systems for Steinberg's Ltd., a supermarket chain in the Montreal area. The initial Steinberg test store in Dorval, a nearby suburb, includes 320 items marked with the Universal Product Code (UPC) symbol which allows automatic scanning at the checkout counter.

Since most manufacturers are not yet source marking their products with the UPC, Steinberg spends up to 200 man-hours each week affixing sticky-back UPC labels so these products can be scanned. Among the hand-marked items are 154 private label items used by the market and 100 nonfood items such as light bulbs and nylons, Sobrian said.

To alert and educate users about the impending switch to the IBM system installed last July, the supermarket began using "bag stuffers" explaining the UPC and how the new terminals would speed checkout, especially in peak periods. Sobrian could not estimate how much this process had been speeded up, but he said during high-volume times there are never more than five customers waiting in a checkout line.

Steinberg has taken several steps to reassure customers who might be concerned about the lack of price on each item. Grease pencils are available as customers enter so they can mark each price on their selection if they wish.

In addition, the store maintains a "complete price list for coded items" posted in a conspicuous place. Finally, Steinberg has installed a "demonstration terminal" in the store so customers can run their selected items through a scanner before going to the checkout line.

In practice, customers have made little use of the grease pencil or the terminal. Sobrian said only 5% of the shoppers pick up the grease pencils and few marks appear on the items at checkout, which leads him to think some people may just want a free marker.

Some customers do use the terminal but typically they run one or two items through the scanner to see how it works and few take the time to run all their items through before going to the checkout, he said.

A few problems have cropped up with the system. The visual display panel was difficult for customers to see because of glare so it is being redesigned by IBM, according to a Steinberg circular.

Since the store is using gummed UPC labels, there was a possibility that some switching of labels might take place. Sobrian said this has not happened because the store has security people in the aisles and the area is an affluent one where people would not be prone to try and cheat on price.

CW Photos by Ronald A. Frank

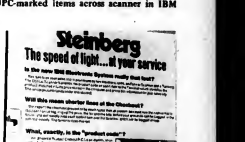
Clerk at Steinberg store prepares to pull UPC-marked items across scanner in IBM 3660 supermarket system.

As customers are checked out, the scanner does go faster than any shopper who wants to keep track of prices as they are being displayed. An IBM spokesman was asked how fast the prices appear on the display but he gave an indirect answer. It was clear that shoppers cannot keep up with the prices as they are displayed.

One of the explanatory bag stuffers invites shoppers to bring any errors to the attention of the store manager and it stresses the benefits of the complete item information that is recorded on the sales slip.

Bright sunlight can affect the laser scanner in the checkout terminals but this problem is minimal, an official of the store said.

One functional problem with the terminals is that they have no capability for accepting credit cards of any type. An IBM spokesman acknowledged this drawback but refused to comment on whether IBM was working to solve this problem.



Steinberg used "bag stuffer" pamphlets to sell users on the advantages of the IBM/UPC checkout system.

The Steinberg store has 12 terminals; the first was installed in July. The in-store controller totals all sales information and it is polled several times per week by a host 370 over 2,400 bit/sec private lines.

CICA Goals Include Idea Interchange, Product Information

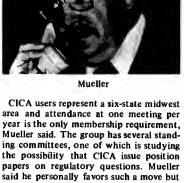
CHICAGO – The Chicago Industrial Communication Association (CICA) held its annual conference and exhibition by featuring a special series of technical sessions dealing with data communications.

About 150 members and guests attended the three-day meeting, and more than 30 firms displayed their products and services.

The 24-year old group presently has 133 members representing 77 companies in the midwest. "And we accept both large and small users," commented William Mueller, CICA president.

The main purpose of the group is to foster the interchange of ideas and to inform each other about new products and services, he said.

According to Mueller, who is manager of telecommunications at Morton-Norwich Products, Inc., most CICA member companies are either operating or planning data communications facilities.



Mueller

CICA users represent a six-state midwest area and attendance at one meeting per year is the only membership requirement, Mueller said. The group has several standing committees, one of which is studying the possibility that CICA issue position papers on regulatory questions. Mueller said he personally favors such a move but any decision on this will not be made until early in 1975 after the committee has made its recommendations.

Information about the CICA is available from Louis F. Brehmer Jr., supervisor of telecommunications, Joseph T. Reyerson and Son, Inc., 2558 W. 16th St., Chicago, Ill. 60608.

Bell System May Seek Approval For 'Automatic Rate Adjustment'

CHICAGO – Bell System companies are now planning to seek approval for automatic adjustment of phone rates, and such automatic adjustments might eliminate the usual proceedings now required before a tariff rate is approved, according to Robert Tarrell, chief hearing examiner of the Illinois State Commerce Commission.

Speaking before a luncheon session of the CICA annual conference, Tarrel revealed that the Bell System has been watching the progress of the fuel adjustment charges now being levied by electric companies. "The success of these automatic adjustments has convinced the telephone companies to seek something similar," Tarrell told the attendees.

The first evidence of these automatic rate adjustments occurred in New Jersey where the state regulatory commission approved an automatic adjustment for the AT&T for "certain increased costs such as wages." And several months ago Illinois Bell filed a new tariff with the Illinois Commerce Commission "for an automatic adjustment of monthly rates" based upon changes in phone company revenues and expenses, Tarrel explained.

The proposal is currently under consideration, and approval by the commission "is yet to be determined," he said. The proposal did not escape the attention of the public and it has received considerable opposition, he added.

As presently structured these automatic adjustment clauses will not dispense with rate setting procedures, the regulatory official said. "But the danger is not what they start out with, but rather what they seek to grow into," he warned.

CW at CICA

'Wait and See' Attitude Recommended

VAN Users Advised to Proceed Slowly

MONTREAL – Users should not plan to become dependent on value-added network (VAN) carriers until these systems have been in existence for some time.

This advice was given to attendees at the Iomec Users Association conference by John Alderman, president of Digital Communications, Inc.

The VANs are ideally suited for users with a "sparsely distributed private network." For those with just a few terminals in any one city, the VAN can provide an alternative at much less expense than installing a multiplexer or concentrator, Alderman said.

But such a net is useful only when most of the users can be serviced by the VAN.

CW at IUA

This means the feasibility of the VAN is dependent on "the broadest possible distribution" and this concept is not likely to be achieved in the near future, he cautioned.

The VANs will have an interface between the host CPU and the network that will be different from interfaces to existing nets, Alderman said.

"This means a potentially expensive software effort will have to be made, either by the carrier in the form of a format converter box, or by the user in the form of changes to the operating system, the predicted. "In any case you are going to have to pay for this, and it's not going to be cheap," Alderman warned.

Among the VAN contenders, he identified Packet Communications, Inc. and Telenet Communications, Inc. "I am somewhat less than enthused" because proposed tariffs make it expensive to support a number of users clustered in any given area, and it is doubtful that the VANs will get the necessary funding to get their nets up for at least a few years, he said.

IUA Elects 1975 Officers

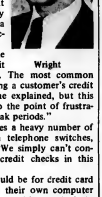
MONTREAL – The Iomec Users Association annual conference was attended by 100 members representing about 45 companies.

Officers elected for the coming year included Jerry Ferris, Iowa Credit Union League, president; Alan Goodyear, American Cyanamid Co., vice-president; and Bernard Weinstein, E.F. Hutton & Co. Inc., treasurer.

The group voted to hold its 1975 meeting in San Francisco while the 1976 conference will be held in Chicago. About 150 companies are members of the association which originally was formed by Digitronics before that firm was acquired by Iomec.

Private Nets Must 'Interrelate'

MONTREAL – A proliferation of private communications systems will no longer serve the future needs of data communications users. Although private systems will continue to operate, there is an emerging trend which will require that these apparently independent nets begin to "intercommunicate" with each other, according to R. Peter Wright, general supervisor for market planning at Bell Canada.



Wright

Speaking at the annual conference of the Iomec Users Association, Wright predicted users operating private networks are going to want a flexibility of choice in their computer services that can be provided only by a network with a universality of access.

As an example, he pointed to the credit authorization field. The most common method for checking a customer's credit is the telephone, he explained, but this method is "slow to the point of frustration especially in peak periods."

This method places a heavy number of [call] attempts on telephone switches, Wright suggested. "We simply can't continue to perform credit checks in this manner," he added.

An alternative would be for credit card companies to have their own computer communications nets with terminals in stores that are continually polled, but such systems mean that the store needs a terminal for every credit card accepted. Five charge plans would require five independent nets that "wander all across the country," Wright told the conference attendees.

Citing a similar example with bank check verification nets, the Canadian carrier official said a solution will be the "intelligent network" being planned by Bell Canada. This switched data network to serve Canadian users will share switching power, concentrators and intercity facilities.

'Midas' Provides Minis Two-Way Ascii Interface

ROCKVILLE, Md. – Compumetrics' modular interactive data acquisition and process control system (Midas) is said to provide two-way serial Ascii interface through a teleprinter card in any minicomputer at rates up to 50 kbit/sec, according to the firm.

The company offers 14 modules, including an analog scanner module, a BCD input module, a stepping motor controller module and analog to digital and digital to analog converter modules.

Midas can also be used in a stand-alone configuration with a teletypewriter, or it can be used on a communications net through a TTY-compatible acoustic coupler, a spokesman noted.

The Midas housing with power supply and controller with interface to computer and teleprinter costs $1,900. Module prices start at $425 from the firm at 12220-B Wilkins Ave., 20852.

Consultant Warns

'Earthly' Problems Complicate Domestic Satellite Usage

NEW YORK – One of the biggest problems confronting users who are considering domestic satellites for data transmission is what happens to the data here on earth, according to Dr. Dixon Doll, a data communications consultant.

Domestic satellite usage is in an "embryonic stage of availability," Doll noted, stressing one of the first problems to solve "relates to the general requirements of terrestrial facilities" connecting user locations to the satellite vendors' (carriers) earth stations.

"Obviously, the high quality of the satellite channel is limited by the undesirable transmission properties of the terrestrial feeder lines," he said.

Another problem is the relatively small number of earth stations the typical satellite carrier currently has in service, he noted. This implies relatively long distances and high costs for connecting user locations to the earth station whenever a user terminal does not happen to be in one of the locations serviced by the earth station.

But digital networks and satellite services will likely prove very cost-effective in serving portions of the country where these services are available.

"Unfortunately, because such services are only available on a limited geographic basis, they cannot usually be employed for all locations in the user's network," he said. "This can mean dealing with multiple vendors in the common carrier world."

"Users are most concerned with setting up an integrated approach to diagnostics and maintenance, but find few vendors capable of supplying a system solution to the diagnostic and maintenance problem," he added.

In the networking area, the user is faced with reevaluating cost-effectiveness decisions previously made in light of price changes in the Wats and leased line tariffs. Specifically, the advent of the HiD-LoD tariff in June has greatly complicated the network planning problem for voice-grade dedicated users, Doll stated.

"Another problem which will soon be solved, hopefully, relates to the slow to emerge capability of broadcast data transmission channels using satellites," Doll stated.

"Completely new networking approaches" will become cost-justified and entirely new applications areas will open up when broader satellite data services become commercially available, he predicted.

Looking back over the last six months, Doll considered the announcements of IBM's Synchronous Data Link Control and the initial availability of all digital networks for domestic use especially significant events for users.

Doll made his remarks in an interview during a seminar he conducted for *Computerworld's* EDP Seminar Series and the ICC Institute. The seminar will also be held next week in Chicago and Dec. 2-3 in Miami.

Trans-Canada Adds Two Buffered Models To Teleprinter Line

OTTAWA, Ont. – The Trans-Canada Telephone System has added two buffered models to its line of keyboard teleprinters.

Designed as an alternative to the IBM 2740 Model 2 terminal, the Datacom 600 features a standard, expandable 440-character buffer, according to the utility.

The 600 operates at a line speed of 1,200 bit/sec and a print speed of 30 char./sec. The programmed terminal uses a Diablo Hytype 1 as its print mechanism.

The teleprinter's stored program is said to be tailored to individual user needs and it can be preprogrammed before delivery.

A utility spokesman noted the line protocol and 9-bit BCD code used to communicate with the host computer, is dependent on the stored program.

Intended for multipoint, multidrop, private-line applications, the Datacom 600 uses a standard EIA RS-232C interface.

Both vertical and longitudinal redundancy checks are available with this teleprinter. The digital version of the 600 leases from Trans-Canada for $235/mo; the terminal in the analog mode costs $245/mo.

Specialized Terminal

The second buffered model, the Datacom 500, is essentially a specialized terminal with a 120-character buffer and a 134.5 bit/sec line speed, the spokesman said.

The terminal employs a modified IBM Selectric typewriter as a keyboard entry and hard-copy printer output mechanism with a communications controller. Transmission controls and indicators are mounted at the side of the typing keyboard, he added.

In addition, the 500 will operate with BCD code, odd parity, 75- or 135 bit/sec, asynchronous speed; full addressing and polling capability and remote service for isolation and correction of terminal malfunctions.

Designed primarily for the consumer finance industry, the 500 may be purchased directly for $5,402 from Northern Electric Development Corp.

Manufactured by Data Measurements Corp. of Santa Clara, Calif., information concerning both terminals is available from Trans-Canada Telephone System at One Nichols St., Ottawa, Ont. K 1G3N6.

System Helps Plant Meet Air Standards

ETIWANDA, Calif. – A steel products company has found that a computer can help reduce air pollution and save electricity at the same time.

Ameron, Inc.'s Steel Producing Division receives reports from its IBM 1800 which enable the company to estimate how well it is meeting state air-quality standards.

"We have found that, by limiting how long our furnace roofs are open, we can lower pollution levels and increase productivity," said Jack Miller, vice-president and general manager. "Naturally, the lower the heat losses through the roof, the less electricy we need to operate those furnaces."

Sensors attached to the computer automatically report each opening and closing. Open time is now being kept to a minimum whereas before the roofs were staying open longer than necessary, Miller said.

The reports generated by the computer are used as information on compliance by air-quality agencies.

The computer also monitors the furnaces and reports the use of electricity. It notifies the melter and suggests curtailment if a problem exists and, if he fails to take action, the computer cuts the power.

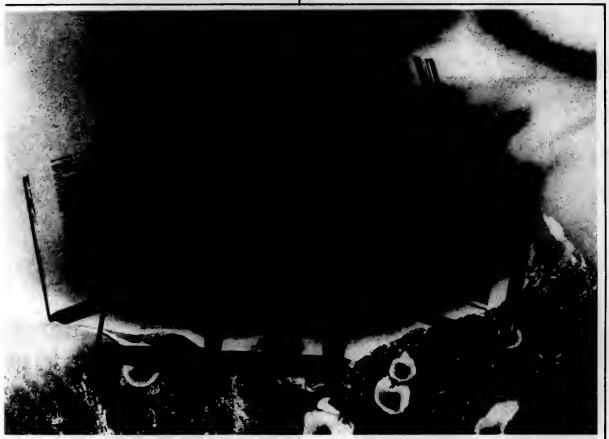
"Our savings in electricity alone more than equal the monthly cost of the DP system," Miller said. "And, obviously, by reducing our demand for electricity we allow the utility company to conserve large amounts of energy. "

"We've found that we can use power more effectively without any sacrifice in production or quality."

The computer also helps in the process of recycling scrap iron. The metal is melted down, cast into billets and hot-rolled into rods and bars for use in various finished products.

But each batch of scrap metal is different, so after the 15 basic trace elements are analyzed the computer assigns a quality value to the batch and recommends a particular use for each billet.

If the basic ingredients supplied to the furnace don't blend into a proper mix, the computer prints out the types and amounts of additives needed. In addition, it monitors the amount of oxygen used to aid refining in the big furnaces.



Scots to Speed Rush-Hour Trains

GLASGOW, Scotland – During rush hour, a train enters or leaves the Central Station here about every 30 seconds. If one train is delayed, it holds up the one behind it, and the one behind it, ad infititum – each waiting for a new platform assignment.

Delays average 150 train-minutes per day – a sum that recent tests show could be cut by about half with the introduction of a computer.

The proposed system being studied by British Rail will assist the regulator whose job it is to schedule trains, assign them and then reassign them to platforms in such a way that other trains are not trapped or delayed.

Docking Record

The computer would also keep the docking record, a job now performed by the assistant regulator, who uses crayon to mark the details on a glass-covered map.

Dubbed Junction Optimization Technique (JOT), the system would store the entire timetable, complete with docking information and destinations, on disk.

Tests show that JOT's great problem is housekeeping – coping with messages and requests from the regulators and organizing all the incoming train data.

Planners hope installation of the JOT system will reduce the staff needed in the station and increase the capacity of existing stations without expensive building projects.

Customer Input Effective Way To Reduce Errors

LOS ANGELES – "The DP professional can assist users in their overall work flow and problems when data entry is accomplished by customer personnel," said Dave Childs, vice-president of the Association of Data Center Owners and Managers, when he spoke to the National Association of Accountants here recently.

Childs believes customer control is the most effective way to eliminate errors in data prepared for service bureaus processing.

"Assume a retail men's clothing store sells suits priced from $85 to $300. In an accounts receivable situation an invoice appears charging a customer $30 for a suit. In the DP center keypunch environment the operator will invariably key the $30 figure.

"In the customer input system, nine out of 10 times, the customer's data input operator will discover the error because he knows the company doesn't sell suits for $30. Consequently, the wrong figure will never be entered into the system," he said.

"The successful operation of the DP system should be the responsibility of the customer for whom the system was designed. The computer is only the power source which propels the system and produces the system results," he added.

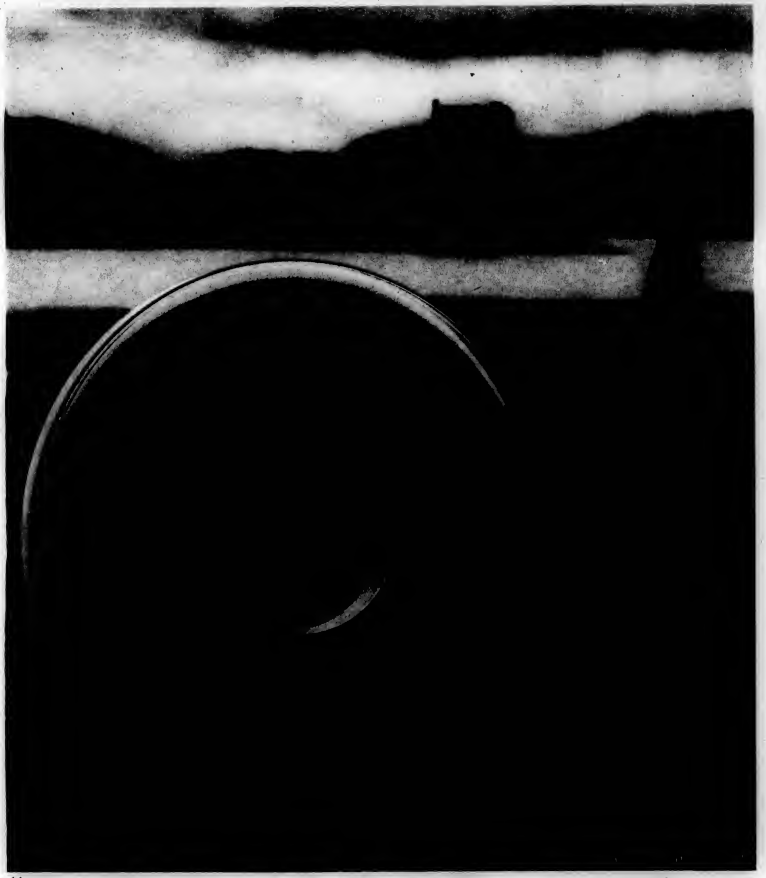
Professor/Architect Makes Dream Come True

CAMBRIDGE, Mass. – A 29-year old professor at MIT long ago decided designing one's own house is a common man's dream.

So in 1965 Nicholas Negroponte and some colleagues began work developing a computer that could translate the architectural layman's whims and wishes into a working blueprint.

Part of the system is a program called Hunch, which transforms a rough sketch penned on paper into a simple blueprint, complete with a flowchart of room-to-room traffic.

Negroponte's "architecture machine" is designed to distinguish between what was meant to be a straight line, curve or corner and can also sense how much pressure is applied to the pen, thereby deciding if a line was deliberate or a mistake. If the computer is unsure of some part of the sketch, it asks a question or two to clear matters up.



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NCC Restructures Program Group

MONTVALE, N.J. – A nine-member management staff has been appointed for the 1975 National Computer Conference (NCC) program committee, with Irwin Derman, manager of systems design, National Bank-Americard, Inc., named vice-chairman.

The staff is part of a new two-tiered structure being implemented for the NCC '75 program committee, according to Stephen W. Miller, program chairman. The first tier consists of the nine members, whose duties are to monitor the relevance of the entire program and to assure that all key program areas are covered adequately.

Technical area directors, selected by this group, compose the second tier and will develop minipro grams in specific areas of computer science.

The conference will be held from May 19-23 in Anaheim, Calif.

Societies/ User Groups

IEEE Catalog Published

LONG BEACH, Calif. – The 1974 fall-winter edition of the Institute of Electrical and Electronics Engineers (IEEE) Computer Society's *Publication Catalog* is now available.

The 16-page booklet includes outlines of topics covered in Compcon Digests, selected IEEE Press books and proceedings from various symposia in the computer field.

Catalogs are available, free of charge, from IEEE, Publications Offices, 5855 Naples Plaza, Suite 301, 90803.

Call for Papers

SECOND ANNUAL CONFERENCE ON COMPUTER GRAPHICS AND INTERACTIVE TECHNIQUES, SIGGRAPH '75, June 25-27, Bowling Green, Ohio.

Papers are being solicited on current developments and research in the areas of theory and technique, hardware and software systems and applications.

Abstracts should be sent as soon as possible to SIGGRAPH '75, Department of Computer Science, Bowling Green State University, Bowling Green, Ohio 43403.

I/O in Future Environment Subject of IOSA Seminar

STAMFORD, Conn. – The Input/Output Systems Association (IOSA) will hold its Sixth Annual I/O Systems Seminar Nov. 13-15 in New York City. The seminar's theme is "Role of Input/Output Systems in the Future Data Processing Environment."

The seminar will focus on systems and applications in a series of sessions on topics including (teleprocessing, terminal systems, direct data entry, key-to-disk and tape, minicomputers/microprocessors, voice response, card equipment, printers, OCR/OMR, point-of-sale, credit and ID card equipment, cash dispensing equipment and electronic funds transfer systems.

Registration fee for the seminar is $50 per day and is applicable to IOSA membership for nonmembers.

For further information, contact Carroll A. Greathouse, IOSA, 999 Bedford St., P.O. Box 1333, 06904.

Societies/ User Groups

Eastern Bank Auditors Merge With BAI Group

PARK RIDGE, Ill. – A group of eastern bank DP auditors has merged with the Bank Administration Institute (BAI) headquartered here.

The merger, which took place this month, brought the former Eastern States Association of Bank Data Processing Auditors (ESA) into the audit commission of BAI.

According to Neil Jackson, former ESA president, the merger will facilitate national programs and participation in bank audit programs and give a high priority to a revision of the BAI audit manual.

The current document, *Auditing in an EDP Environment*, goes back to 1967, he said.

BAI is also taking over the sponsorship of the annual ESA conference, now called the "BAI Conference on EDP Auditing," scheduled for April 28-May 2, 1975 in Disneyworld, Orlando, Fla.

Calendar

Nov. 7-10, New Orleans – Annual Meeting of the Society for Computer Medicine. Contact: Dr. Michael Jenkin, 20560 Linden Road, Excelsior, Minn. 55331.

Nov. 11-14, San Diego – Meeting of Association of Computer Machinery. Contact: Luis Villalobos, Hughes Aircraft Co., 2020 Oceanside Blvd., Oceanside, Calif. 92054.

Nov. 13-15, Houston – Public Utility Information Systems Conference, sponsored by the American Gas Association (AGA) and Edison Electric Institute. Contact: George W. McClung, AGA, 1515 Wilson Blvd., Arlington, Va. 22209.

Nov. 13-15, Milan – 13th International Automation and Instrumentation Conference. Contact: Federazione delle Associazioni Scientifiche e Techniche, Piazzale R. Morandi, 2, 20121 Milano.

Certain little-publicized activities are at this very moment reshaping the computer industry.

Without your realizing it, they've already taken over a third of computer services... they now account for half of all operator-oriented terminals . . . and today they are responsible for 10% of the minicomputer market.

By 1980 these activities could account for over 30% ($13 billion!) of the entire computer industry.

In fact, these unheralded yet booming activities have indeed become an industry unto itself—the autotransaction industry—an industry of POS systems, computerized banking systems, hospital management systems, credit verification, hotel systems, off-track betting, automotive services and much, much more. You get the idea. The way people see computers!

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CI Notes

CIA Offers Document Index

ENCINO, Calif. – For followers of the IBM-Justice case who are swamped in the tons of documents or are wandering through reams of microfiche, the Computer Industry Association is offering an index service.

Indices are available for $10/mo in each of four areas: subject, docket number, schedule of depositions and by fiche. The latter includes document titles, source, date of document and fiche map reference location. It is also available in hard copy.

All four services cost $40/mo from the association at 16255 Ventura Blvd., 91316.

NCR Sets Communications Group

DAYTON, Ohio – NCR Corp. has formed a Communications Systems Division to ensure communications compatibility among NCR computers and terminals.

The division will consolidate a number of design, development and assembly activities including the design, development and manufacture of microprocessor-based modules. Headquarters are in Columbia, S.C.

The unit is headed by Hugh J. Lynch, former director of Advanced Development Engineering and Software Development for NCR's DP Division.

In a separate move, NCR has revealed plans to construct a $10 million headquarters building here, scheduled to be completed by October 1976.

Supershorts

Electronic Memories & Magnetics Corp.'s Computer Products Division has completed its 100th Model 3650/65 addon memory for IBM 360/65s.

– – –

Modular Computer Systems, Inc shipped its 1,000th system five months ahead of industry projections. Modcomp began shipments in December 1970.

– – –

Data General Corp. received its first order for an Eclipse computer from Rockwell International Corp., System Monitoring Division.

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ITT Diversified Services, Inc. will handle sales and service of Talos Systems, Inc.'s Telenote Systems. The units are made to facilitate transmittal of graphic information over telephone lines.

– – –

Brandon Applied Systems, Inc. has formed a European subsidiary, Brandon Applied Systems Europe, Inc., which will establish processing capability in the UK and a marketing force in Scandinavia, West Germany and southern Europe.

CML Defends Joint Satellite Venture

By a CW Staff Writer

WASHINGTON, D.C. – In a reply to the Federal Communications Commission (FCC), CML Satellite Corp. denounced arguments set forth by opponents of the proposed restructured communications corporation (CML-R), which would include IBM as a 55% partner, along with Comsat General.

"Public interest, convenience and necessity would be served by a grant of the relief sought by the Joint Petition at the earliest feasible time," CML's reply said.

"If any radical changes in policies and procedures" are made on the part of the FCC, these should be made applicable "to all competitors in the domestic satellite (Domsat) marketplace, not just to CML-R," the reply noted.

An infusion of capital from Comsat General and IBM will be needed by the first quarter of 1975, the CML document said. If the FCC action on the joint petition is delayed beyond that time, "the contributions that CML-R can make to the private-line (business and government) communications market by offering the services it anticipates will be delayed and possibly jeopardized."

Filings in opposition to the move have been made by American Satellite, Data Transmission Co., Domestic Satellite Corp., ITT World Communications, Inc., RCA, Southern Pacific Communications and Western Union.

In addition, Sanders Associates and Sperry Rand have registered complaints, along with the Justice Department and the Federal Trade Commission. The Computer Industry Association and the North American Telephone Association have also filed their opposition to the plan.

These opponents, "in necessary effect, ask the commission to divert its primary responsibility to nurture improved and innovative services for the public and turn to a policy of protectionism for private entrepreneurs," CML said.

However, there is ample precedent that it has been the FCC's policy "not only to permit integration into Domsat applicants of existing customer bases, of research and production capacities in the technologies of space and communications and of large financial resources, but also to encourage the integration of such resources as enhancing the possibility of the success of these private venturers in a new and yet-to-be established market," CML stated.

The reply also pointed out that the FCC's Second Report has encouraged consolidations and mergers as being in the public interest "in spite of Section 7 of the Clayton Act, upon which most of our opponents now rely."

'Consuming Aim'

Drawing the distinction between regulated and nonregulated industries, the reply reminded the FCC that "competition and equalization among competitors cannot become the consuming aim of the commission . . ."

CML maintained that since its opponents had so vigorously protested its entry, one might infer that they deemed their services and capabilities inferior.

The public should have the higher level of service and competition that CML-R would contribute" rather than "be restricted to the lower level of service and competition which our opponents say or imply are the limits of their capacities," CML said.

The opponents' objections to the proposed restructuring provide no basis to bar the entry of CML-R, the reply contended.

Among the opponents' arguments are: competitors lack similar capability to develop new services, CML-R and AT&T might split up the marketplace, users will find CML-R's services superior and IBM is involved in litigation under antitrust law.

Others have proposed that certain conditions be imposed uniquely on CML-R, such as requiring inclusion of a terrestrial carrier, with whom it would compete, as shareholder of more than 15%; interconnection with competing terrestrial carriers; and a barrier between CML-R and shareholders in order to deny it the benefits of technological and marketing knowledge and skills.

"Such conditions are either against the public interest or are improper conditions unless applied equally to all competitors in the Domsat markets, CML contended.

On the subject of a possible market split between AT&T and CML-R, the reply indicated "this growing need for integrated communications services simply cannot be met by one of their communications suppliers providing voice communication while another of their suppliers provides data or image."

The fact that IBM is involved in antitrust litigation is irrelevant to the application, CML said. "Unless the commission wants to take over the function of the courts, there is no need for it to try those issues here."

U.S.-IBM Trial Could Begin Despite Loose Ends: Edlestein

By Molly Upton
of the CW Staff

NEW YORK – Judge David N. Edelstein warned attorneys for the U.S. and IBM that he is prepared to start the trial in the case of U.S. vs. IBM even if all loose ends are not tied.

The loose ends discussed in a two-day pretrial hearing here last week included how to procure documents from the Department of Commerce and the implications, such as delays for new depositions, of what IBM claims are "new issues" contained in the Department of Justice's statement of issues.

"Don't you have enough old issues?" Edelstein asked attorneys.

Timetables and various procedural matters were also tackled.

In an effort to expedite matters, Edelstein asked lead attorneys Raymond Carlson, representing the U.S., and Thomas Barr of Cravath, Swaine and Moore, IBM's counsel, to consider "the desirability of stipulating the entire [Telex] record" in this case.

"Would that give us a head start?" he asked. This move would enable both sides to draw on the record as they would any other evidence being explained.

In addition, in one fell swoop it would give them access to all material in the Telex case, rather than only certain stipulations.

Barr branded the move "very daring and interesting." He said his "mind was racing" and he would have to consider the suggestion.

"I have *no* doubt that it would serve a very useful purpose," he added.

Carlson was amenable to the suggestion noting "if there is any possibility IBM will accept" the proposal, "it is definitely probable" the U.S. will.

Edelstein's suggestion cut short what amounted to name calling between Barr and Carlson over the issue of resolving stipulations, those matters that are acceptable as fact by both parties.

Considerable time was consumed discussing the reluctance of the Secretary of Commerce to release certain data.

Carlson asked for "some form of a protective order that takes in as many aspects of confidentiality that the court can foresee . . ."

Commerce has data collected under the Export and Defense Production acts as well as under the Census Act.

The problem, Carlson said, is that the Justice Department and the Commerce Department have "found no way the law permits the Secretary of Commerce to exercise discretion on the release of material collected under the Census Act."

After some discussion on the degree of confidentiality afforded nonparties under Pretrial Order 13 and the order in May 1972, Edelstein suggested the attorneys spend half an hour combining the two to produce a protective order that would solve the problem.

Efforts on this matter failed, however.

The two teams were told to prepare separate documents, which Edelstein said he would combine, if they couldn't prepare one between them.

Oct. 25 was suggested as the date IBM will file its brief and Carlson asked permission to file a response after that date.

The day Eastwest Mutual delivered Mr. Fliegel's Safe Driver Policy.

It could have been the programmer, or maybe it was Twinkie crumbs on the drive rollers. The fact remains, just one little computer error could bend your department's operation way out of shape.

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When it's BASF...you know it's not the tape that goofed

The brain on the left costs four times as much as the brain on the right.

These days, it's costing a lot more to get a computer programmed than it does to get the computer.

So anyone with any sense of proportion is now checking out systems software as carefully as they used to check out hardware.

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Our Real-Time Disc Operating System (RDOS) does a lot of work other operating systems expect programmers to do. To create a file named "FRED," for example, all you have to do is type in "CREATE FRED." You don't have to scout around for the best place for the file, or give it an address, or make sure it won't get disturbed. RDOS does all that for you.

And unlike a lot of other operating systems, you don't have to know RDOS inside out to put it to work for you. The commands are simple, straight-forward, easy-to-remember. To run a program named "BRAIN," just type in "BRAIN" (instead of gibberish like !#AREA, 3@1000, 5@2000! BRAIN@1000@2000).

As a matter of fact, RDOS is so easy to use that anyone who's ever worked in FORTRAN should be able to develop programs with it.

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GA 'Right on Target' to Become A $200 Million Company by 1978

By Toni Wiseman
Of the CW Staff

ANAHEIM, Calif. – Despite the softening economy, General Automation, Inc. (GA) is right on target in its goal to become a $200 million company by the 1978 fiscal year, according to Raymond J. Noorda, president.

The introduction of a new series of data management systems was designed to enhance this position.

"The problems facing us, however are many," Noorda said. "First there is continued strong competition from the top. IBM has always been and always will be a major force in the computer business and a tough competitor in the fight to share in the industry's top-end growth.

"In addition, recent announcements from the semiconductor industry have shown that minicomputer manufacturers no longer have it all their way at the bottom end of the market either.

"Add to this gloomy statements about rising costs through inflation, high interest rates and the resulting slowdown of our economy, and one can be led to paint a black picture indeed," he said.

'Lean' and 'Mean'

Noorda discussed his "lean, mean and hungry" philosophy, stating that GA has taken some major steps internally to adopt an agressive marketing posture.

This includes the formation of marketing divisions to focus on each of the traditional business areas – industrial automation, communications and standard products and systems.

This organization, he said, is backed up by the recent creation of a Customer Services Division which ties together the various functions of field service, systems quality assurance and training.

The company's new marketing thrust, data management systems, includes a line of systems and applications packages ranging from a stand-alone first-time user product to a multiprogramming system with "performance in excess of major mainframes at mini prices."

The advent of minis has made buying decisions more complex, noted Norm Rothstein, director of data management system marketing. In the days when data processing first become commercially available, the average businessman was faced only by a "yes/no" decision: Should he or should he not buy a mid-sized batch processor?

Today, the decision involves questions such as "How do I use the data processing capabilities? Do I merely need to transfer the information from one place to another? Do I need a network capability to process the information locally and transfer summary information to a central source? Or do I need a network capability to poll a number of remote locations and massage huge amounts of information at a central location?"

GA, Rothstein said, views the data management marketplace as essentially a trichotomy of distinct buying motivations and needs.

"At the top of our pyramid are those companies that have more than one physical facility" and who need a network-oriented system, he said.

"The second level is represented by a number of specific, vertical market industries that require custom-tailored solutions for dedicated activities.

"In numbers, the greatest potential for data management solution is the first-time user," Rothstein said of the third group.

With the announcement of the DM 200 Series, which ranges from the DM 220 remote job entry (RJE) terminal through the IBM 1130-replacement DM 230/2 to the DM 240 batch processing system with on-line inquiry capability, GA feels finally it has the data management problem surrounded, Rothstein affirmed.

Shugart President Resigns

SUNNYVALE, Calif. – Shugart Associates' founder, Alan F. Shugart, has resigned as president.

He was replaced by Donald J. Massaro, former vice-president of operations.

Contracts

Incoterm Corp. has received a contract from Carlton Industries for over $228,000 worth of SPD 20/20 intelligent terminal systems, services and peripheral items.

Honeywell's process Control Division has signed a $14 million contract to build process computers for General Electric's Nuclear Energy Division for nuclear power generating applications. The Model 4400 computers will be delivered over a six-year period beginning in 1975.

Control Data Corp. (CDC) has received two contracts from Hughes Aircraft Co. The first is for five microprogrammable processors which will be applied to the weapons control systems trainer for the F-14 fighter aircraft, emulating on-board CDC 5400B computers; the second is for continued production of CDC's 5400B, used in aircraft weapons management and related aircraft function handling.

Bunker Ramo Corp.'s Electronic Systems Division has received a $4 million contract from the U.S. Air Force's Rome Air Development Center for data processing and support terminals for worldwide intelligence data gathering and analysis.

Information International, Inc. has been awarded a lease contract from Chrysler Corp. for Comp 80 microform composition system which will enable auto engineers to record plots and drawings on microfilm and also will produce Chrysler's internal telephone directory.

National Sharedata Corp. has signed a five-year, $3 million agreement with The Bank of A. Levy in Oxnard, Calif., to manage and operate the bank's DP facility and market automated services to other businesses in the area.

Distronics Corp. has received a service contract from John M. Frey Co.

'Clockwork' Reflects Belief That T/S Costs Should Fall

By Molly Upton
Of the CW Staff

WALTHAM, Mass. – Since the cost of processors and memories is going down, time-sharing (T/S) firms should be able to reflect these savings in customer rates, said James Burley, First Data Corp.'s vice-president of marketing, in explaining Clockwork, the firm's new pricing scheme.

But, he added, the cost of peripherals is not being reduced, so it makes sense to charge for the items that are costly.

In Clockwork, First Data has eliminated the CPU utilization charge. All that is left is a charge of $10/hr for connect time and a charge for mass storage ranging from 10 cents to 40 cents per 1,000 characters.

The standard rate among T/S firms is around 50 cents per 1,000 characters, Burley said.

"I think Clockwork represents the next marketing approach for timesharing. I think time-sharing is getting out of the black magic . . . kind of age and going more into merchandising, sort of like minis have done," he said.

In addition to cutting costs, the elimination of the CPU charge lets customers estimate the cost of a job before actually running it, since typing time on a terminal can be estimated pretty closely, he noted.

There are limitations on Clockwork, such as a program size of 120K bytes and no operator coverage. File transfers are done at night.

Since peripherals aren't used that much in interactive T/S, First Data has found it does not need to fully configure each system but can switch peripherals from one system to another.

First Data has five Digital Equipment Corp. Decsystem-10s here, one of which is dedicated to facilities management for the National Institute of Health.

Generally, for large computer processing, average T/S rates run $20/hr to $60/hr. Clockwork charges $10/hr with storage charges running 20% to 75% of going rates, Burley said.

The reception has been very good, he noted, commenting several N.Y. banks have signed on for certain applications.

'A Definite Trend'

"T/S companies are going to find out soon that people are really going to question what they're spending for T/S. There's going to be a definite trend, and we're going to recognize it before anyone else.

"I think T/S can certainly justify much lower rates than what we're charging, particularly for processing," Burley said.

While Burley thinks this type of merchandizing approach will be a trend, he doesn't see every T/S company jumping on the bandwagon because they have large customer bases willing to pay the current rates and many provide extensive consulting services.

Univac's Bundling Policy Target Of $30 Million Antitrust Suit

PHILADELPHIA – Univac's bundling policies have come under attack from United Software Corp., which has filed an antitrust suit for more than $30 million against Univac, the Sperry Rand Corp. and its Defense Systems Division.

The suit seeks to prevent the release of Level 32 of Univac's 1108 operating system.

United Software, which sells tape labeling packages for use on Univac Series 1100 computers, asked that the tape labeling part of the Univac operating system be priced separately to reflect its cost.

At hearing on United Software's motion for a preliminary injunction, scheduled for Oct. 29, followed a week of deposition-taking from other mainframers.

Univac's bundled pricing, the complaint said, constitutes a tying agreement in violation of the Sherman and Clayton Acts and is an aspect of its overall monopolization of the 100 Series computer software market.

According to the complaint, United Software alleged that Univac has imposed a "proprietary restriction" on its users in order to ensure that details of its interfaces are not transmitted to other firms in the industry.

As a result of this restriction, Univac has "foreclosed" United Software from competition and has locked users into Univac to the exclusion of United Software, the complaint charged.

In an amended complaint which is under consideration, United Software named as codefendants R.E. McDonald, Sperry Rand's president, Univac's executive vice-president of worldwide marketing and services Harry A. Steinberg and G.G. Probst, Univac president.

The individual defendants, the complaint charged, implemented a scheme "in conspiracy with other companies and educational institutions," using "phantom software" to sell the Series 1100 at "proforma artificially high prices."

The scheme enabled coconspirators to receive unjustified tax benefits and enabled defendants to maintain an artificially excessive published price, the complaint said.

Under the scheme, the coconspirators would be given credit for allegedly nonexistent software they provided to the defendants, thus resulting in lower prices for them, the amended complaint said.

Univac was charged with using various means, including threats of intimidation, to prevent users from buying outside software. Furthermore, Univac made "false and misleading and premature announcements of technological innovations to reduce the competitive position of plaintiff's products," United Software charged.

Short Work Week Stings UK, DP Sales, Exports Down Sharply

LONDON – Sales and exports of computer equipment took a nose dive in the UK during the first quarter of this year, undoubtedly showing the effect of Britain's three-day workweek.

The downturn could signal yet another balance of payments deficit, according to *Computer Weekly*.

Sales of mainframes were down to less than $62.6 million from almost $88.2 million during the first quarter a year ago.

Maintenance Exports Drop

Exports of mainframes also dropped to a little over $32.5 million from $44 million for the same 1973 period.

Total exports of computer equipment improved over the year-ago figure but were less than the $134.6 million registered in the last quarter of 1973.

Total exports stood at less than $102 million compared with $83.5 million for the same quarter last year.

Sales and exports of peripheral equipment were also down from the 1973 fourth-quarter figures but ahead of those for the first quarter of 1973.

Peripheral sales for the recent period registered about $92.8 million and exports about $46.4 million, while figures for the preceding period were $116 million and $69.6 million respectively.

The newspaper noted that in 1973 peripherals eclipsed mainframes as the principle source of revenue and export sales for the industry.

Total value of all equipment sold by the UK industry in the first quarter was $250.6 million which, due to higher peripheral sales, was greater than the $236.6 million figure during the first quarter of 1973.

However, the total value of sales for the fourth quarter of 1973 was nearly $299.3 million.

International News

Ontario Consolidation Bids In

TORONTO, Ont. – Plans for centralization of Ontario's DP needs are under way with the receipt of bids from five mainframe makers for equipment to be used in three data centers.

Bids were received from Control Data Canada Ltd., Honeywell, IBM Canada Ltd., Univac and Xerox of Canada Ltd., a spokesman said.

Benchmarks are about to be run, and plans call for selection of equipment by Dec. 30.

In line with recommendations made by the Committee on Government Productivity, which called for the consolidation and restructuring of the government's systems and programming functions, the number of centers was cut from five to three as of April 1.

Computer centers previously belonged to the individual ministries, but the functions have been brought together under the auspices of the Computer Services Division.

The centers are functionally split into one designed to perform engineering and scientific work, commercial scheduled processing and commercial demand processing, a spokesman said.

The government is currently operating two IBM 370/158s, a Univac 65 and a Univac 1106.

The consolidation has put new demands on the centers, however.

The selected equipment will be leased for two years initially, the spokesman said. After that, it will either be purchased or put on a longer lease, depending on how the equipment has performed. Or, he added, the two-year lease plan could be continued.

Each center's needs will be evaluated individually, he added.

Book Describes Progress Of Japanese DP Industry

TOKYO – *Progress of Computer Industry in Japan* is designed to present an overall view of the DP industry and computer utilization in Japan.

Coauthored by the Japan Electronic Computer Co. Ltd. and Most & More, Inc., a research firm, the book illustrates with colored graphs the growth of the industry as well as future projections compiled by government and United Nations surveys.

The books costs $10 by air mail or $8.50 by surface mail from Research Department, Japan Electronic Computer Co. Ltd., New Kokusai Bldg., 4-1 Marunouchi 3-chome, Chiyoda-ku, Tokyo 100, Japan.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Position Announcements

COMPUTING MANAGER

of a new Xerox Sigma 9 computing facility. Environment includes local and remote batch, time-sharing, and transaction processing. Requires bachelor's degree or equivalent, and 5-8 years' broad EDP experience, including 2 years' management experience. Submit resume to:

Personnel Department
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260 Crittenden Blvd.
Rochester, New York 14642
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MGR-EDP PLANNING
25 – 28K

Our client, a major West Coast firm (not L.A.), has asked us to find an individual with the following skills:

EDP Capital Planning
Hardware/software
Evaluation & Acquisition
Technical Support
Data Communications

All inquiries will be held in absolute confidence.

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1621 S.E. 114th,
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Washington 98004
(206) 455-9600

PROGRAMMERS

Fortune 500 mfg firm is currently seeking several COBOL programmers eager for a new challenge. You will work as part of a team implementing sophisticated information systems for their 370-155. Requires degree, min 2 yrs COBOL prog + the ability to communicate effectively with user mgmt. Salary to $15,000 (fee paid)

Contact: Bill Grady

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Found 148 Federal St.
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(617) 423-5440

SYSTEMS ANALYST
PROGRAMMER ANALYST

2 years minimum experience on IBM 360-370 OS-MVT, VS1. Banking experience preferred.

Send resume to
Colorado National Bank,
Personnel Office
P.O. Box 5168 T.A.
Denver, Colorado 80217
an equal opportunity employer

ASST.
EDP MANAGER

Eastern Mass. municipality seeks individual with knowledge of COBOL AND computer operations to assume responsibility for the development of new systems. Will assist users in defining their EDP requirements and design and implement new systems. Must have demonstrated ability to communicate with users at all levels of management. New position. Previous municipal experience desirable. Salary negotiable. Send resume to:

R. Kobayashi, Mayor's Office
City Hall
Malden, Mass. 02148

RESEARCH PROGRAMMING SPECIALIST

Ball State University has an immediate position for an experienced OS-FORTRAN Programmer in small office providing statistical and technical support for research. Atmosphere busy, informal, and dedicated to client services. 18 days paid vacation, excellent fringe benefits. $10-11,000. Send resume and salary history to:

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Muncie, Ind. 47306
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SR. PROGRAMMER
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We are a major securities trading firm seeking an individual to join staff engaged in the continuing development, enhancement and cutover of an existing real time minicomputer communications, trade-entry and information retrieval system. This is an outstanding opportunity to participate in the most advanced system of its kind in operation today. Real time minicomputer and teleprocessing experience required. Compensation will be a function of experience.

Please call or send resume, in confidence, to:
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Weeden & Co. INCORPORATED
25 Broad St., New York, N.Y. 10014
An equal opportunity employer

HELP!

CIBER, Inc. (Consultants in Business/Engineering/Research) is having growing pains. We are searching high and low for qualified computer specialists with:

H-600/6000 utilizing COBOL and/or FORTRAN IDS would be a definite plus.

IBM 360/370 OS utilizing PL/1, ALC and/or COBOL IMS would be a definite plus.

We currently serve the data processing community in several areas; positions are available in Illinois, Ohio and Kentucky, although most assignments are in beautiful Michigan.

Our benefit plan is excellent including such extras as cancer, dental and vision insurance at no cost to the employee. In addition, CIBER offers above average salaries and is managed with the employee in mind.

To investigate these opportunities call Bob Stevenson collect at (313) 559-9210, or send a complete resume in confidence to:

[illegible]

INFORMATION SYSTEMS PROFESSIONALS

San Francisco and Houston

SENIOR SYSTEMS ANALYST
(1—San Francisco, 1—Houston)

To design, develop and implement operating systems in manufacturing, distribution, and service subsidiaries in the U.S. and Canada. Minimum requirements: concentration in manufacturing systems development, experience with Honeywell S-6000 and IMS-6000, or IBM-BOMP, CSMS, or MRP. Travel 10-20%.

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(San Francisco area)

To provide programming expertise including coding, testing, debugging, documentation, and implementation of computer programs. Minimum requirements: concentrated program experience in manufacturing operations using COBOL.

- *Both positions report to corporate office (not part of accounting function).*

Rucker is a profitable $100 million + company (NYSE), growing at 25%+ rate internally and concentrates in the manufacture of all tool drilling equipment, safety electrification products, and industrial automation. Rucker is installing a major Honeywell 6000 series computer system.

Please forward detailed resume, including current compensation, in complete confidence.

Corporate Recruiting
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1330 Broadway
Oakland, California 94612

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RUCKER

HONEYWELL
CUSTOMER ENGINEER
Unusual Opportunity

In-House Maintenance for a Large Multi-Systems user in Central Pennsylvania. Must have 5 years on H-200's & H-2200's. Salary to 17K plus company paid benefits and moving expenses.

Send resume to
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797 Washington St.
Newton, Mass. 02160
All resume's strictly confidential.

PROGRAMMER ANALYST
Pharmaceutical Research

Due to a promotion, we are offering an excellent opportunity for a career growth in the pharmaceutical industry. The position will involve systems analysis and programming related to all aspects of a variety of research applications including data base design, information retrieval and report writing, etc.

Candidate should have a BS or MS in Math or one of the Sciences, along with 3 years non-statistical research or commercial programming experience. Knowledge of COBOL, JCL and IBM utilities (IBM System 370) will be required, plus one of the following: PL 1, FORTRAN or ASSEMBLY LANGUAGE.

The appointment offers excellent benefits, and is located in a suburban metropolitan location, adjacent to the parkway. Convenient public transportation.

Resume including salary information may be sent to:
Manager of Scientific Employment
Schering Corporation
60 Orange Street
Bloomfield, New Jersey 07003

SCHERING CORPORATION
Applicants of all races are encouraged to apply . . . Female/Male

COMPUTER PROFESSIONAL

GTE has an unusual, good-paying opportunity for a Software Specialist.

GTE Information Systems is currently seeking an experienced computing professional. We have an IBM 370/145 VS1 operating system which will be growing into a VS2 environment. Applications will be developed using currently installed IMS/DL1 data base systems. An immediate personnel requirement, arising solely out of our continuing growth and success in the marketplace, calls for a Software Specialist with the following credentials . . .

- OS/VS internals, with knowledge of HASP
- IMS/DL1 . . . CICS . . . INTERCOMM internals experience desirable.
- Communication networking desirable
- Ability to be-bug COBOL applications problems
- Four to six years of in-depth IBM software and hardware experience.
- Initiative and creativity a must

As a large corporation, GTE Information Systems provides not only highly competitive salary, but genuinely worthwhile benefits, stability, security, and professional treatment and respect.

If you feel you qualify, please send your resume, including salary history, to:
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East Park Drive, Mt. Laurel Industrial Park
Mt. Laurel, New Jersey 08057
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GTE INFORMATION SYSTEMS INCORPORATED

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BIOSTATISTICIAN

Continuing growth requires that we add to our Biostatistical Staff, with the position offering an excellent career opportunity in a pharmaceutical research environment. Responsibilities will emphasize the statistical analysis of clinical trials being conducted by physician members of our medical research group, and involvement with coding of data associated with the case reports being submitted.

Candidate should have an MS in statistics (or equivalent) with about 1 year experience of an applied nature, either in industry or as a consultant while attending graduate school.

The appointment offers excellent benefits and is located in the pleasant suburban metropolitan area adjacent to parkway. Convenient public transportation.

Please send your resume, including present salary information to:

Manager of Scientific Employment
Schering Corporation
60 Orange St.
Bloomfield, N.J. 07003

SCHERING CORPORATION

Applicants of all races are encouraged to apply . . . Female/Male

SALESMAN WANTED

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Excellent opportunities for man now selling computer ribbons, typewriter ribbons and computer tapes.

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PROGRAMMER

Systems Programmer to develop, install, and maintain system support programs for a new Xerox Sigma 9 computing facility. Bachelor's degree or equivalent, and at least 2 years' systems experience required. Experience with CP-V operating systems highly desirable.

Personnel Department
The University of Rochester
260 Crittenden Blvd.
Rochester, New York 14642

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COMMUNICATIONS SPECIALIST

CNS has a teleprocessing technical support position that will provide a great challenge. This includes the responsibility for one of the most advanced bank TP systems in the country. Incumbent should have at least three years experience in communications programming. A thorough knowledge of public utilities communications facilities, trouble shooting techniques and FECP theory is required. BTAM, TCAM, and CICS experience is helpful.

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Career advancement opportunities for experienced ANS Cobol and assembler programmers. We offer an IBM dual 370 OS VS1 working environment with challenging account applications. Knowledge of communications systems such as EPTS and use of structured programming techniques desirable. Pleasant working location, great working conditions and liberal fob benefits.

Call Collect (614) 461-7852, (evenings (614) 864-3265) or send resume: Attention Randy Miller.

City National Bank
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An Equal Opportunity Employer

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Our growth from $11 million annual sales in 1967 to over $100 million in fiscal 1974 has made us a world leader in the computer peripheral industry. This growth rate has created exceptional opportunities for your career advancement as a national technical support specialist.

We have several openings for individuals with a minimum of 5 years experience in servicing and providing technical support to disk and/or tape peripherals on IBM 360/370 systems. These positions are located in our corporate headquarters in Anaheim, California. Travel required.

Send resume and specific salary history to
Don Modie,
2411 W. La Palma Ave., Anaheim, Calif. 92801

CALCOMP
CALIFORNIA COMPUTER PRODUCTS, INC.
An equal opportunity/affirmative action employer

Applied Automation, Inc., a wholly owned subsidiary of Phillips Petroleum Compnay, located in Bartlesville has the following openings:

PROGRAMMER/ANALYST

Programmer/Analyst to generate cost estimates, proposals, and design for control system software. Generates operating system and prepares and checks out application programs. Participates in in-plant startup of system. Experience in design, generation, and checkout of software for on-line, real-time data acquisition and/or control systems is required. Experience with pipeline, oil field gathering, terminal, and/or gas distribution systems is preferred. Hardware experience is desirable, but not essential.

APPLICATION SOFTWARE ANALYST

Designs, develops, and documents general software packages for use in on-line, real-time data acquisition and/or control systems. Serves as consultant to Application Programmer/Analysts in designing software for specific applications. Develops computer programs and procedures to aid Programmer/Analyst in configuring operating systems software and data base generation. Prefer Science or Engineering graduate with 2-5 years software experience with minicomputers and assembly language programming. Experience with on-line, real-time data acquisition and/or control systems desirable.

SOFTWARE RESEARCH ENGINEERS

The positions offer challenging creative opportunities in computer process control system software including research and development activities related to:

- operating systems
- telecommunications for high-speed serial data transfers
- microprogramming for distributed processing systems
- analog and digital data acquisition and control
- advanced data display systems

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Applied Automation has a need for a software engineer with experience in the chemical or petroleum processing field to specify software requirements and develop software systems for applications requiring:

- preparation of operating summaries
- operating guidelines and instructions
- optimization of process performance
- data base specification and management

Applied Automation, Inc., is a young dynamic company. Company benefits program includes generous vacation, thrift and retirement plans. Community offers excellent schools and fine recreation facilities. Inquiries kept in strict confidence and answered promptly. Please write:

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Data Processing Careers
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Fidelity Union Tower West
Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
1700 Fisher Building
Detroit, Michigan 48202

HARTFORD
Compass, Inc.
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Hartford, Connecticut 06105

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Minneapolis, Minnesota 55402

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dotal Associates
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New York, New York 10017

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Electronic Systems Personnel
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436 Forbes Avenue
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EDP Professionals

Programmers, Analysts, Project leaders — The S.E. is the fastest growing region in the U.S. Our firm is currently representing companies throughout the S.E. and the majority of our openings are in Florida. If you have 1 to 5 years experience in any of the following key professionals, & if you background qualifies you for any of the following positions or if you are interested in pursuing opportunities in an EDP field contact Dave Stanewick.
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DATA PROCESSING
IRANIAN CITIZENS
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Experience desirable in any of the following:
IMS, Data Base Design & Communications,
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Experience desirable in any of the following:
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Bachelor's Degree in Math, Econ, Engineering or Computer Science.

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Experience desirable with any of the following:
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IBM: 370, 15B, 145, S/III
HONEYWELL: 6000

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Important Message to Programmers/Systems Analysts:

"NBD provides a range of career possibilities within the bank — as well as upward movement within EDP."
Ronald Zinnar, Group Development Manager, discusses a project with Frank Ross, Programmer.

NBD
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"As a December '67 graduate of Wayne State University with a B.S. in Business Administration, I joined NBD in 1968 as a programmer trainee. I became a Senior Programmer in '69, Group Manager in '70, and Project Manager in October '71. In June '73 I was named an officer and promoted in January '74 to my present position as Group Development Manager.

"NBD came up to all of my expectations as an undergraduate. They have offered me many opportunities to advance my career. During my development period, I was given assignments which exposed me to complex computer systems, advanced management and IBM courses. The career path is rewarding at NBD!"

Key Opportunities are now available at NBD for:
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EDP
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Opportunity for experienced dealer or computer in the renowned computer equipment marketplace in Silicon New. Division of a major IBM 370 leasing company with initial home office on the East Coast.

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Computer Systems of America, Inc.
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SYSTEMS ANALYST

Excellent opportunity to work in an innovative educational environment. Challenging, interesting, and rewarding on-line & batch administrative related computer application programs. Recently installed IBM 370/125. Applicant should be capable of sys gen and be able to act independently in a project mode. Thorough knowledge of COBOL is a must. Minimum 3 years. Bachelor's degree or equivalent. Graduate degree preferred. Salary commensurate with experience. Send resume stating qualifications, experience, and salary requirements to:
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Hartford Community College
401 Thomas Rush Blvd.
Hartford, Conn. 06112
For more information call 838-1080 or 879-8920, Ext. 311
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SYSTEMS PROGRAMMER

We need DOS experience with assembler, sysgen, macro writing and physical I/OCS. Experience with OS and/or complex systems such as CICS would also be helpful.

Position is with fast support group consisting of five people for a very large DOS shop. Responsibility includes maintenance of in-house developed 'Structured Processing' system, an OS development and evaluation project, support for application programmers and continued development of system enhancements.

If you have 2-3 years experience and have demonstrated excellence in at least one of the above areas, please send resume, salary history and requirements to:

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For information call Roy Flieger (904) 356-1424 business hours or (904) 772-7758 off hours.

IMMEDIATE OPENINGS IN COMPUTER SYSTEMS AND APPLICATIONS

The Battelle Computer Center operates CDC Cyber-73 and 6400 Computer Systems, including an extensive network of remote batch terminals and both alphanumeric and graphical interactive devices.

We are presently seeking candidates with training and experience in the following areas:

USER SERVICES/DATA MANAGEMENT
Requires experience using COBOL, SORT/MERGE, file access methods, and Data Base Management Systems to assist users with Data Management applications, including reliability testing and performance evaluation of BDP software.

OPERATING SYSTEMS PROGRAMMER/ANALYST
Requires at least three years experience in operation systems design, programming, and implementation, with an emphasis on telecommunications, including debugging of new features, modification of the existing SCOPE/INTERCOM operating systems, and identification and correction of system problems.

COMPUTER GRAPHICS PROGRAMMER/ANALYST
Desire individuals with training in interactive and batch graphics. Experience in data base design, interactive techniques and mini-computer applications highly desirable.

COMPUTER SCIENTISTS/SYSTEMS ANALYSTS/PROGRAMMERS
At least 3-5 years experience in software design and programming for computer systems of different manufacturers together with a capability and interest in transferable software, advanced software development and documentation technology, and programming and evaluation standards development. Openings also exist for candidates with some experience in computer-based real estate appraisal.

These openings are available immediately and require individuals with the ability to work on a diversity of projects under limited supervision. Send resume to:

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Battelle
Columbus Laboratories
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In addition to your 10 years experience in scientific computation, you must have proven abilities in designing and implementing a new simulation language. Knowledge of CSSL, RSSL, CSMP, Modeling experience is necessary, including both digital and hybrid techniques to simulate physical systems. Working knowledge of the characteristics and techniques of major, real-time, multi-programming operating systems of multi-user capability is desirable. Your major responsibility will be design and development of a new simulation language producing information needed to characterize a hybrid model of physical systems.

SCIENTIFIC SOFTWARE PROGRAM MANAGER
Requiring at least 8 years experience in scientific computation, this position also demands proven capability in planning, staffing and controlling large scientific software systems. Your skills must include effective management of software development activities. Broad know-how in these areas is necessary: development or modification of real-time operating systems for new generation large scale digital computers. Proven abilities in modelling physical systems for hybrid and digital simulation required.

HYBRID COMPILER EXPERT
Your 8 years experience in scientific computation must have been focused on modelling expertise, employing hybrid techniques to simulate physical systems. Significant experience in design and implementation of compilers — analog and hybrid — is required.

If you are a gifted professional and would like more information, send your resume, or better yet —

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SYSTEMS PROGRAMMER

HOSPITAL INFORMATION SYSTEMS

Highly qualified individual required to maintain and extend Operating Systems of a large, multiprogrammed minicomputer, supporting remote data entry terminals and data acquisition from laboratory terminals. System maintains patient and employee data bases with subsystems serving various departments of the hospital.

Bachelor's Degree + 3-5 years Real Time experience is essential. Masters Degree desirable, as is experience in Data Communications and Data Base Management and Graduate Courses in Computer Science helpful.

Applicant must already live within commuting distance from Metropolitan New York City.

Please submit your resume, establishing qualifications, current and desired earnings, in complete confidence to:

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EDP SYSTEMS PROGRAMMERS

(Overseas)

ARABIAN AMERICAN OIL COMPANY needs programmers with degree in Computer Science, Physical Science, Engineering or Mathematics.

Must have at least 3 years edp experience including OS systems programming on IBM 360/370 or 2 years OS systems programming including responsible charge.

SPECIFIC REQUIREMENTS INCLUDE:

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senior technical analyst

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Manager to coordinate and lead development of academic computer usage. Advanced degree plus several years programming, consulting and university computing experience required. System 370/135 — VS1 installed. Salary commensurate with experience. Contact resume with William Clark, Director, Personnel and Staff Benefits, Northern Michigan University, Marquette, Michigan 49855. *An equal opportunity employer.*

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Newton, Mass. 02160

SYSTEMS ANALYST

A state level agency is seeking a systems analyst with the following qualifications:

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- 2-3 years Systems Analysis experience
- Capability to deal with people
- Skills in written communication
- Self-starter
- FORTRAN experience desired but not required.

The position is located in Jefferson City, Missouri, and requires limited travel. The individual will have responsibilities involving the coordination and development of a statewide information system. Send resume and salary requirements to:

CW Box 4227
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Newton, Mass. 02160
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PROJECT MANAGERS PROGRAMMER/ANALYSTS

A consulting and computer services company specializing in the design and implementation of Material Requirements Planning systems is seeking individuals with programming and systems background in manufacturing applications. An understanding of B/M Processor and M.R.P. is required. Production and Inventory Control user experience will be a plus. A challenging opportunity with a professional team. Excellent salary/company benefits. Please send resume, including references, to:

RICHARD C. LING
VICE PRESIDENT
ARISTA INFORMATION SYSTEMS, INC.
P.O. Box 4775
Winston-Salem, N.C. 27107

Arista

DATA PROCESSING

We are currently seeking the following EDP professionals for our Seattle and San Francisco offices:

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PROGRAMMER

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Honeywell 3d-Period Earnings Drop 41%, Despite Revenue Rise

MINNEAPOLIS – Honeywell, Inc. incurred a 41% drop in third-quarter earnings despite an increase in revenues and a "satisfactory level of orders and backlogs in most segments."

President Edson W. Spencer listed the major reasons for the drop as a decline in the level of outright sales in the firm's computer business, increasing cost levels throughout all operations and a substantial increase in interest expenses.

"Margins in the computer business . . . declined as a result of higher cost of sales levels as well as operating expenses and, to a lesser extent, because of start-up costs associated with the April introduction of our new line of computers," Spencer said.

"Due to the decline in outright sales, total revenues did not increase sufficiently to offset these cost increases," he added.

"Price increases have been instituted in most segments of the company and vigorous cost-reduction programs are under way to ease the pressure on margins," he noted.

"The benefits resulting from these actions, of course, will only partly help 1974 results."

Third-quarter earnings dropped to almost $13 million or 67 cents a share from $22.3 million or $1.17 s share in the year-ago period.

Revenues for the quarter rose to $621.2 million from $587.5 million in the 1973 period.

For the nine months, earnings dropped 10% to $54 million or $2.81 a share compared with $60 million or $3.16 a share a year ago.

Revenues rose nearly 11% to $1.9 million compared with $1.7 million in the same year-ago period.

Worldwide computer revenues equaled last year's third-quarter figures and were higher than 1973's nine-month period.

Rental and service revenues for the quarter rose 5% to $173.3 million. In the nine months the figure was $516.8 million, 6% ahead of last year's figures for that period.

Computer shipments for the quarter were "substantially ahead of last year and slightly more than the first nine months of 1973," the company said. Returns are running well below a year ago, the firm added, and net bookings were comparable to levels established in the first nine months of 1973.

Spencer said customer response to the new line of Series 60 computers continues to meet expectations, with net order levels showing a satisfactory upward trend.

Operating Income Up at Itel

SAN FRANCISCO – Although Itel Corp.'s third-quarter earnings were even with those of a year ago, income before special credits rose to $2.7 million compared with $1.7 million in the year-ago period.

Earnings for the three months were $2.8 million or 37 cents a share.

Revenues rose to $35.5 million from $29 million in the same 1973 period ended Sept. 30.

Nine-month revenues reached a record $104.5 million compared with $65 million last year.

Earnings managed a rise to $7.3 million or 96 cents a share from $5.3 million or 71 cents a share last year.

Income before special items totaled $8.9 million compared with $3.2 million in the same 1973 period.

Figures for 1973 have been restated to reflect discontinuance of certain businesses as well as a change in the company's method of accounting for investment tax credits from the flow-through to the deferral and amortization method.

Sycor Scores Increase In Nine-Month Report

ANN ARBOR, Mich. – Earnings and revenues were up during the third quarter and nine months ended Sept. 30 at Sycor, Inc.

The 19% third-quarter revenue rise to $10.3 million from $8.7 million a year ago was attributable to the growth of revenue from equipment on lease, while outright sales remained strong, commented President S.N. Irwin.

The intelligent terminal maker saw third-quarter earning rise to $1.5 million or 54 cents a share compared with $1.3 million or 47 cents a share in the year-ago period.

For the nine months, earnings reached $3.7 million or $1.33 a share compared with $1.3 million or 51 cents a share a year ago, when there was a $2 million special charge. Tax credits in both years were nearly comparable at $1.4 million.

"In the face of higher money costs – and at a time of inflation and international economic concern – we are especially gratified by the uptrend in profitability which Sycor has maintained," Irwin said.

FASB Adopts Regulation For Charging R&D Costs

STAMFORD, Conn. – Companies must charge off research and development costs as incurred effective Jan. 1, in keeping with a new rule adopted by the Financial Accounting Standards Board.

Those firms that do not presently write off R&D costs as incurred will be required to restate past years' financial results as though previously deferred research costs had been charged off. The adjustment will show up as a charge against retained earnings, so companies do not have to charge these costs against a current earnings statement, according to the rule.

Exemptions are granted for firms doing research for other parties under contract or research directly reimbursable by other parties.

Earnings Reports

COMPUSCAN
Three Months Ended Aug. 31

	1974	1973
Shr Erng	8.16	8.31
Revenue	2,138,000	1,629,000
Tax Cred	107,000	76,000
Earnings	236,000	171,000

GENERAL AUTOMATION
Year Ended Aug. 3

	1974	1973
Shr Erng	$1.69	$1.21
Revenue	61,423,982	30,381,522
Tax Cred	------	500,000
Earnings	4,305,049	2,781,641

APPLIED DIGITAL DATA SYSTEMS
Nine Months Ended Aug. 31

	1974	1973
Shr Erng	8.52	8.07
Revenue	6,418,171	2,278,444
Tax Cred	980,000	72,886
Earnings	1,960,176	228,434

WESTERN DIGITAL
Year Ended June 30

	1974	1973
Shr Erng	$1.50	$1.38
Revenue	13,386,498	6,482,460
Earnings	2,200,140	469,045

COMPUTER HORIZONS
Six Months Ended Aug. 31

	1974	1973
Shr Erng	8.02	8.19
Revenue	1,301,304	1,473,750
Earnings	13,017	118,797

DATAPOINT
Year Ended July 31

	1974	1973
Shr Erng	$1.66	$1.08
Revenue	34,063,000	16,545,000
Tax Cred	1,051,000	779,000
Earnings	3,401,000	1,957,000
3 Mo Shr	.85	.44
Revenue	9,103,000	6,407,000
Tax Cred	226,000	245,000
Earnings	938,000	820,000

EDP RESOURCES
6Three Months Ended July 31

	1974	b1973
Shr Erng	8.09	8.24
Revenue	1,380,000	1,842,000
Spec Cred	75,000	------
Earnings	71,000	178,000

a-Unaudited, b-Revenues include the company's share in the net income of Tele/Resources.

INTEL
Three Months Ended Sept. 30

	1974	1973
Shr Erng	8.53	8.40
Revenue	34,463,000	18,500,000
Earnings	3,475,000	2,600,000
9 Mo Shr	2.52	2.80
Revenue	103,172,000	42,040,000
Earnings	16,779,000	5,165,000

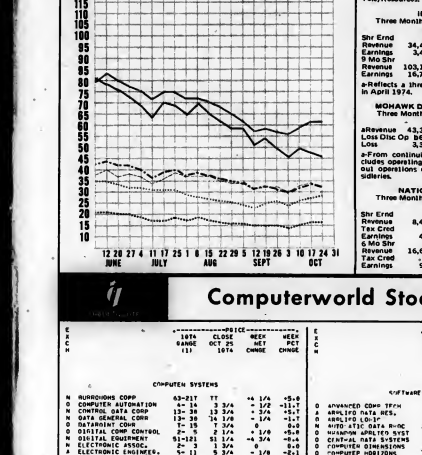
a-Reflects a three-for-two stock split in April 1974.

MOHAWK DATA SCIENCES
Three Months Ended July 31

	1974	1973
aRevenue	43,314,000	40,805,000
Loss Disc Op	b600,000	5,653,790
Loss	3,345,000	1,311,000
a-From continuing operations, b-Includes operating losses during phase-out operations of discontinued subsidiaries.		

NATIONAL CSS
Three Months Ended Aug. 31

	1974	1973
Shr Erng	8.44	8.40
Revenue	8,430,913	5,653,790
Tax Cred	------	52,000
Earnings	483,406	430,395
6 Mo Shr	.86	.75
Revenue	16,661,095	10,934,158
Tax Cred	------	104,400
Earnings	946,489	817,679



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Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADEHOUSE, INC. Cambridge, Mass. 02139

E C H	STOCK	PRICE-RANGE (1)	CLOSE OCT 25	WEEK NET	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	63-21T	TT	+4 1/4	+5.0
O	COMPUTER AUTOMATION	4- 1%	3 3/4	-1/2	-11.7
N	CONTROL DATA CORP	13- 3B	13 3/4	+ 3/4	+5.7
N	DATA GENERAL CORP	13- 3B	14 1/8	+ 1/4	+1.8
O	DATAPOINT CORP	T- 1%	T 3/4	0	0.0
O	DIGITAL COMP CONTROL	2- %	2 1/4	+ 1/8	+5.8
N	DIGITAL EQUIPMENT	51-121	51 1/4	+4 3/4	+8.4
N	ELECTRONIC ASSOC.	2- 3	1 3/4	0	0.0
A	ELECTRONIC ENGINEER.	%- 11	5 3/4	+ 1/8	+2.1
N	FOXBORO	19- 4B	25 1/4	+1 5/8	+6.8
O	GENERAL AUTOMATION	12- 4B	12	+ 1/4	+2.0
O	GRI COMPUTER CORP	1- 2	1	1/8	0.0
N	HEWLETT-PACKARD CO	58- 9B	67 1/4	+1 1/4	+1.8
N	HONEYWELL INC	23- 8%	25 1/4	+1 1/4	+5.2
N	IBM	152-251	101 1/4	+1 1/4	+0.6
N	INTERDATA INC	8- 2%	13 1/4	+1	+18.4
O	NICSOBATA CORP	2- %	2	1/8	+5.0
N	NCR	17- 4%	17 1/4	+ 1/4	+0.4
N	PERKIN-ELM CO	71- 3B	22 3/8	+ 3/8	+1.6
N	SINGER CO	13- 4B	13	+ 1/4	+1.9
N	SPERRY RAND	24- 4%	27	+ 1/2	+1.8
A	SYSTEMS ENG. LABS	1- %	1	0	0.0
N	TEXAS INSTRUMENTS	80-115	65 1/4	+2 1/2	+3.9
O	ULTRADATA SYSTEMS INC	1- 2	1	+ 1/4	+33.3
N	VARIAN ASSOCIATES	%- 13	8 3/4	- 1/4	-3.5
N	WANG LABS.	7- 20	11 1/2	+1 5/8	+14.4
N	XEROX CORP	61-127	49 5/8	+3 5/8	+8.4
	LEASING COMPANIES				
O	AMERICAN COMP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1+ 7	1 3/8	- 3/8	-21.4
O	COMPUTER GROUP CORP	1+ 4	2 1/8	0	0.0
O	COMPUTER EXCHANGE	1+ 4	1/8	0	0.0
O	COMPUTER INVSTRS GRP	1+ 4	1/4	0	0.0
O	COMP. INSTALLATIONS	1+ 4	1/4	0	0.0
O	DATRONIC RENTAL	1+ 4	1/4	0	0.0
A	DCI INC	1+ 4	3/8	0	0.0
N	DPF INC	2+ 4	2 5/8	+ 1/8	+5.0
O	EDP NTSB-RICES	2+ 3	3 1/4	0	0.0
O	ENTERPRISE MGT	1+ 3	1/2	0	0.0
A	GREYHOUND COMPUTER	2+ A	2 3/4	+ 1/4	+10.0
A	ITEL	2+ 4	2	0	0.0
A	LEASCO CORP	5+ 12	8 1/4	+ 1/8	+1.5
O	LEASPAC CORP	1+ 4	1/2	0	0.0
O	LECTRO MOT INC	1+ 4	1/4	+ 1/8	+100.0
O	NRB INC	1+ 4	1 1/2	+ 1/8	+9.1
A	PIONEER TEX CORP	2+ 16	3	0	0.0
A	ROCKWOOD COMPUTER	1+ 1	1/2	-	+12.5
N	U.S. LEASING	5+ 24	8 1/8	+1 1/4	+12.0

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E C H	STOCK	PRICE-RANGE (1)	CLOSE OCT 25	WEEK NET	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	3/4	0	0.0
A	AMPLIFO DATA RES.	1- 3	1 1/4	- 1/8	-8.3
A	AMPLIFO LOGIC	1- 3	1 1/4	0	0.0
N	AUTOMATIC DATA PROC	21- 47	29	-3 1/8	-12.1
O	BRANDON APPLIED SYST	1- 2	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	1 1/2	0	0.0
O	COMPUTER HORIZONS	1- 5	1 1/4	0	0.0
O	COMPUTER NETWORK	2- 3	2	0	0.0
N	COMPUTER SCIENCES	2- A	2 1/2	+ 1/8	+5.2
O	COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O	COMPUTER TECHNOLOGY	1- 2	1/2	0	0.0
O	COMPUTER USAGE	2- A	2 1/4	0	0.0
O	COMRESS	1- 1	3/8	+ 1/8	+50.0
O	CONRAC CORP	2- A	2 1/2	+ 1/8	+5.2
N	CORDURA CORP	7- A	1 5/8	- 1/8	-7.1
O	DATA 100	1- 2	1 1/4	0	0.0
A	ELECT COMP PROD	1- A	1 1/8	0	0.0
N	ELECTRONIC DATA SYS.	17- 25	12 1/2	5/8	+4.8
O	INFORMATIONAL INC	1- 2	1/4	0	0.0
O	INFO. DATA CORP	1- 1	1/2	0	0.0
O	INFO. SCIENCES	1- 2	1/2	0	0.0
O	INS CONSULTANTS MARKET.	1- 1	1/2	0	0.0
O	INTERACTIVE	1- 2	1 1/4	- 1/8	-21.4
O	KEYDATA CORP	1- A	1 1/4	- 1/8	-21.4
O	MACRO	1- A	1 1/4	0	0.0
A	MANAGEMENT DATA	1- 2	1 1/4	- 1/8	-12.5
O	NATIONAL CSS	1- 2	1	-1/2	-22.2
O	NATIONAL COMPUTH CO	1- 1	1/4	0	0.0
N	ON LINE SYSTEMS INC	1+- 10	10 1/4	+ 5/8	+3.5
N	PLANNING RESEARCH	2- 3	2 3/8	- 1/8	-5.0
O	PROGRAMMING & SYS	1- 2	3/8	0	0.0
O	RAPIDATA INC	1- 5	2 1/4	- 1/8	-5.2
O	SCIENTIFIC COMPUTERS	1- 1	5/8	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/2	+ 1/8	+33.3
O	TCC INC	1- 1	1/4	- 1/8	-50.0
O	TYMSHARE INC	A- 12	7 1/2	1/2	+7.1
O	UNITED DATA CENTER	2- A	2 1/2	+ 1/8	+5.2
A	URS SYSTEMS	2- A	1 7/8	- 1/8	-6.2
A	WYLY CORP	2- 5	2	- 1/8	-5.8
	PERIPHERALS & SUBSYSTEMS				
N	ANDREXSCOGRAPH-MULT	A- 11	A 1/8	- 5/8	-13.1
O	ADVANCED MEMORY SYS	1- 5	1 3/8	- 1/8	-15.3
N	AMPEX CORP	1- 5	3 3/4	- 3/8	-15.3
O	ANDERSON JACOBSON	2- 4	2 3/4	0	0.0
O	BEEHIVE MEDICAL ELEC	2- 3	2 3/4	0	0.0
O	BOLT-BERANEK & NEW	2- 5	3 1/2	0	0.0
N	BUNKER-RAMO	A- 18	6 3/4	- 1/2	-6.9
N	CALCOMP	5- 11	6 1/4	- 5/8	-9.1
O	CAMBRIDGE MEMORIES	A- 16	6 1/8	- 1/4	-3.9
O	CENTRONICS Data Corp	7- 23	19 1/4	+1 1/2	+12.5
O	CODEX CORP	A- 15	12 3/4	- 1/2	-3.7
O	COMNETRONICS	1- 2	3/8	0	0.0

E C H	STOCK	PRICE-RANGE (1)	CLOSE OCT 25	WEEK NET	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 2	3/8	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 1/8	- 1/8	-10.0
O	COMPUTER MACHINERY	1- 2	1	0	0.0
O	COMPUTER TRANSCRIVER	1- 2	1	- 1/8	-10.0
N	CONRAC CORP	8- 22	11 7/8	+1 5/8	+15.8
O	DATA ACCESS SYSTEMS	2- A	2 1/2	0	0.0
O	DATA 100	5- 13	6 1/2	- 1/8	-1.9
O	DATA PRODUCTS CORP	3- A	3	0	0.0
O	DATA RECOGNITION	1- 2	1/4	0	0.0
O	DATA TECHNOLOGY	2- A	1 7/8	0	0.0
O	DECISION DATA COMPUT	13- 43	4	- 5/8	-13.5
O	DELTA DATA SYSTEMS	1- 2	5/8	0	0.0
O	GIANN CONTROL CORP	1- 2	1/2	0	0.0
N	ELECTRONIC M & M	2- A	1 1/2	- 1/8	-7.6
O	FABRITEK INC	2- A	2 1/4	0	0.0
O	GENERAL COMPUTER SYS	1- A	2 1/2	0	0.0
N	GENERAL ELECTRIC	39- 53	39 1/4	- 3/8	-1.0
N	HAZELTINE CORP	3- T	3	- 1/4	-7.8
O	INFORCE INC	5- 8	2 1/4	- 5/8	-21.7
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	1+ 14	6	- 3/4	-11.1
O	LUNDY ELECTRONICS	3- 8	7 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
O	MEMOREX	1- 3	2 1/2	0	0.0
A	MILGO ELECTRONICS	6+ 10	8 1/2	- 3/4	-9.1
O	OPTICAL SCANNING	1- 2	1 1/2	- 1/8	-7.6
O	OPTICAL SCIENCE SYST.	1- 3	1	- 1/8	-11.1
O	PERKIN-ELMER	1- 3	2 3/4	- 1/4	-8.3
O	PERTEC CORP	1- 5	2	- 1/8	-5.8
A	ROTTEC INSTRUMENT	1- 5	2	0	0.0
A	RUSSELCOM INTL	1- 2	1	0	0.0
O	QUANTOR CORP	2- 8	4 1/4	+1 3/4	+70.0
O	RECOGNITION EQUIP	5- 8	5 3/8	- 1/8	-2.3
N	SANDERS ASSOCIATES	2- 8	2 7/8	- 1/4	-8.0
O	SCAN DATA	1- 2	1 1/4	- 1/8	-9.0
O	SYDROTEC TECHNOLOGY	1- 15	8 1/4	- 1/4	-2.9
O	SYCOR INC	1- 13	3 3/4	- 1/4	-6.3
O	TALLY CORP.	2- A	1 7/8	0	0.0
O	TYCOM	1- 2	1 1/4	0	0.0
N	TEKTRONIX INC	22- 48	25 3/4	- 5/8	-2.3
N	TELEX	3- A	3 1/8	- 1/4	-7.4
O	UNIVAC INC	12- 33	13 1/2	- 1/4	-1.8
O	WILTEC INC	2- 8	1 3/4	- 1/4	-12.5
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	A+- 8	A 3/4	+ 1/4	+5.5
O	BARRY WRIGHT	1- 2	1 1/4	+ 1/4	+25.0
O	CYBERNETICS INC	1- 2	1/2	0	0.0
O	DATA COMPONENTS	25- 38	27 1/2	- 3/8	-1.3
O	DUPLEX PRODUCTS INC	8- 17	12 5/8	- 7/8	-6.5
O	EMULEX CORP	1- 3	1 1/2	+ 1/4	+20.0
O	ESSEX MAGNETICS	6- 11	7 1/2	- 3/4	-9.0
O	GRAPHIC CONTROLS	8- 11	9 1/2	- 1/4	-2.6
O	HOHL INC	1- 2	1 1/4	0	0.0
O	MOORE CORP LTD	33- 57	39 1/4	- 1/4	-0.6
O	NASHUA CORP	3- 7	3 1/4	+ 1/8	+3.2
O	REYNOLDS & REYNOLD	6- 35	8	- 1/2	-5.8
O	RUSSELL REGISTER	10- 19	12 1/4	- 1/4	-2.0
O	TAB PRODUCTS CO	5- 11	6	0	0.0
O	UARCO	23- 72	28 1/8	- 5/8	-4.3
A	WABASH MAGNETICS	3- T	3 5/8	0	0.0
N	WALLACE BUS FORMS	14- 24	14 7/8	- 5/8	-4.0

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